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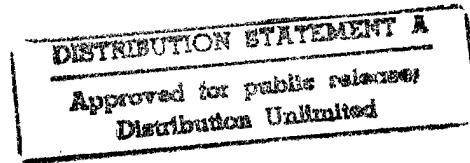
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14 March 1984

# USSR Report

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES



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14 March 1984

USSR REPORT  
LIFE SCIENCES  
BIOMEDICAL AND BEHAVIORAL SCIENCES

## CONTENTS

## AGROTECHNOLOGY

Genetics of Drought Resistance in Soft Spring Wheat, Part 1. Leaf Surface Area and Grains Per Spike (O. I. Gamzikova, N. A. Kalashnik, et al.; IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR, SERIYA BIOLOGICHESKIH NAUK, No 10, Aug 83).....	1
Selection of New Corn Varieties (A. N. Sidorov; IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR, SERIYA BIOLOGICHESKIH NAUK, No 10, Aug 83).....	2

## BIOCHEMISTRY

Immobilization of Glucose Oxidase on Silica Gel (A. L. Simonyan, S. Sh. Tatikyan, et al.; BIOLOGICHESKIY ZHURNAL ARMENII, No 7, Jul 83).....	3
Automated Clinical Chemistry Laboratory. Part 3. Time Standards and Productivity Management (V. V. Makarovskiy, N. V. Gaydukova, et al.; LABORATORNOYE DELO, No 5, May 83).....	3

## BIOTECHNOLOGY

Tunneling Between Quasidegenerate Conformation States and Low Temperature Heat Capacity of Biopolymers. Vitreous Protein Model (V. I. Gol'danskiy, Yu. F. Krupyanskiy, et al.; DOKLADY AKADEMII NAUK SSSR, No 4, Oct 83).....	5
---	---

Developments in Biotechnology (G. G. Shiler; MOLOCHNAYA PROMYSHLENNOST', No 11, Nov 83).....	6
ENVIRONMENT	
Comparative Role of Phytoplankton and Bacterioplankton in Phosphate Consumption in Upper Layers of Southeastern Pacific Water (Yu. I. Sorokin; DOKLADY AKADEMII NAUK SSSR, No 4, Oct 83).....	7
EPIDEMIOLOGY	
Human Disease Clustering Connected to Possible Infection of Cattle With <i>Brucella Melitensis</i> (A. I. Sattarov, M. M. Rementsova, et al.; ZDRAVOKHRANENIYE KAZAKHSTANA, No 4, Apr 83).....	8
Nature of Changes in Antigen Spectrum of Melioidosis Agent in Subcultured Animals (M. K. Peters, N. N. Piven', et al.; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83).....	8
Prerequisites for Ecological Prediction of Reservoirs of Tularemia and Leptospirosis in Connection With National Economic Activity of People (K. M. Sinyak, A. M. Kas'yanenko, et al.; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83).....	9
Stimulating Effect of <i>Brucella Melitensis</i> Lipopolysaccharide on Hematopoiesis in Mice (D. R. Kaulen, A. V. Sanin, et al.; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83).....	10
Features of Nonspecific Resistance in Children With Pulmonary Diseases Caused by Opportunistic Microflora (K. I. Savitskaya, Ye. N. Levina, et al.; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83).....	10
Prolonged Tularemia Carrier State in Highly Sensitized Laboratory and Wild Rodents and Possibility of Development of Latent Infection Into Acute Infectious Process (V. G. Pilipenko, T. A. Shchekina, et al.; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83).....	11

Tularemia in Kazakhstan (N. G. Olsuf'yev; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83).....	12
Distribution of Dermacentor Pictus (Ixodidae) Tick in the USSR (I. L. Kulik, N. S. Vinokurova; PARAZITOLOGIYA, No 3, May-Jun 83).....	12
Sexual Transmission of Tick-Borne Encephalitis Virus in Oxodid Ticks (Ixodidae) (S. P. Chunikhin, L. F. Stefutkina, et al.; PARAZITOLOGIYA, No 3, May-Jun 83).....	13
Diagnosis of Coxsackievirus Infections in Convalescents From Viral Hepatitis (A. G. Shamsutdinova, L. V. Zaprometova; MEDITSINSKIY ZHURNAL UZBEKISTANA, No 2, Feb 83).....	13
Principles of Sanitizing Brucellosis Foci and of Prevention of Human Cases in Uzbekistan (I. K. Galko, L. Ye. Antonova; MEDITSINSKIY ZHURNAL UZBEKISTANA, No 2, Feb 83).....	14

#### FOOD TECHNOLOGY

Problem of Nutritional Protein (V. Samoylenko; ZDRAVOOKHRANENIYE KAZAKHSTANA, No 4, Apr 83).....	15
Prognosis of Tick-Borne Encephalitides (R. L. Naumov; PARAZITOLOGIYA, No 5, Sep-Oct 83).....	15
Collection of Primor'ye Scallops From Bottom Plantations (V. Z. Kalashnikov; RYBNOYE KHOZYAYSTVO, No 9, Sep 83)...	16
Increasing Fodder Protein Production (M. F. Lupashku, M. F. Lala, et al.; IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR, SERIYA BIOLOGICHESKIKH I Khimicheskikh Nauk, No 4, Jul-Aug 83).....	16
Promising Fodder Plant Species for Donbass (Ye. N. Kondratyuk, A. Z. Glukhov, et al.; RASTITEL'NYYE RESURSY, No 2, 83).....	17

#### GENETICS

Cloning of Bordetella Pertussis DNA in E. Coli Bacterial Cell System (I. E. Semina, A. P. Tarasov, et al.; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83).....	18
---	----

Transfection and Infection of <i>Salmonella</i> Plasmid Strains With Bacteriophage P22 H5 (L. A. Ryazanova, V. L. Zaikin, et al.; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83).....	19
Cloning of sup 1 Gene of Yeast <i>Saccharomyces Cerevisiae</i> (A. P. Surguchev, B. Pipersberg, et al.; DOKLADY AKADEMII NAUK SSSR, No 4, Oct 83).....	19
Mapping of UVS1 and UVS2 Mutations in <i>Streptomyces Olivaceus</i> VKX (V. Ya. Lavrenchuk, B. P. Matselyukh; MIKROBIOLOGICHESKIY ZHURNAL, No 3, May-Jun 83),.....	20
Study of Possibility of Conjugation Transmission of RP4 Plasmid From <i>Pseudomonas Aeruginosa</i> to Strains <i>Pseudomonas Mallei</i> and <i>Pseudomonas Pseudomallei</i> (M. K. Peters, N. P. Shipovskaya, et al.; MIKROBIOLOGICHESKIY ZHURNAL, No 3, May-Jun 83).....	21
<b>IMMUNOLOGY</b>	
Present and Future of Immunoenzyme Assay Research Methods in Infectious Pathology (V. I. Pokrovskiy, G. A. Yermolin, et al.; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83).....	22
Changes in Activities of Certain Dehydrogenases in Guinea Pig and Rabbit Lymphocytes After Immunization With Anthrax Vaccine (V. S. Smirnov, V. V. Meretskov, et al.; IMMUNOLOGIYA, No 3, May-Jun 83).....	23
Estimation of Immune Status in Experimental Tetanus Poisoning (G. N. Kryzhanovskiy, A. I. Polyak, et al.; IMMUNOLOGIYA, No 3, May-Jun 83).....	23
Reactions of Cellular Immunity in Brucellosis Patients (L. Ye. Tsirel'son, M. M. Rementsova, et al.; IMMUNOLOGIYA, No 3, May-Jun 83).....	24
Isolation of E Antigen From Plague and Pseudotuberculosis Rods and Induction of Specific Antisera (G. S. Orlov, T. M. Badayeva; MEDITSINSKIY ZHURNAL UZBEKISTANA, No 2, Feb 83).....	25
Autoreactive T Lymphocytes in Experimental Tick-Borne Encephalitides: Heterogeneity and Interaction With Virus-Induced T Suppressors (V. V. Khozinskiy, B. F. Semenov; IMMUNOLOGIYA, No 5, Sep-Oct 83).....	25

## LASER EFFECTS

Morphological Substantiation for Clinical Use of Helium-Neon  
Laser in Peripheral Nerve-Trunk Diseases  
(Ye. M. Yurakh; VRACHEBNOYE DELO, No 5, May 83)..... 26

Influence of Low-Intensity Periodic-Pulsed Laser UV-Radiation  
on Speed of Synthesis of Nucleic Acids in Proliferating and  
Resting Cells  
(T. Y. Karu, G. Ye. Fedoseyeva, et al.; TSITOLOGIYA,  
No 10, Oct 83),..... 27

Effect of Laser Radiation on Non-Specific Factors of Protection  
of the Organism During Experimental Inflammation  
(T. K. Supiyev, S. I. Karabayeva; IZVESTIYA AKADEMII  
NAUK KAZAKHSKOY SSR. SERIYA BIOLOGICHESKAYA, No 2,  
Mar-Apr 83),..... 27

Diagnosis and Laser Treatment of Preretinal Macular Fibrosis  
After Surgical Treatment of Retinal Detachment  
(E. G. Yeliseyeva, N. N. Pivovarov, et al.; VESTNIK  
OFTAL'MOLOGII, No 5, Sep-Oct 83),..... 28

Effectiveness of Laser Coagulation Considering New Vision  
Fixation Points in Late Stages of Disciform Maculodystrophy  
(Yu. A. Ivanishko; VESTNIK OFTAL'MOLOGII, No 5,  
Sep-Oct 83),..... 29

Laser Surgery of Ophthalmic Adnexae  
(M. M. Krasnov, A. V. Bol'shunov, et al.; VESTNIK  
OFTAL'MOLOGII, No 5, Sep-Oct 83),..... 30

Electroacupuncture and Laser Puncture in Postsurgical and  
Post-Traumatic Contractures in Children and Adolescents  
(Yu. A. Plakseychuk; VESTNIK KHIRURGII  
IMENI I. I. GREKOVA, No 10, Oct 83),..... 30

Late Results and Cost Effectiveness of Pulsed Laser Treatment  
of Skin Cancer  
(K. G. Moskalik, A. P. Kozlov, et al.; VESTNIK  
KHIRURGII IMENI I. I. GREKOVA, No 10, Oct 83),..... 31

## MARINE MAMMALS

Transportation of Dolphins From Cuba to Western Europe  
(Yu. Berezhnoy; VOZDUSHNYY TRANSPORT, 1 Dec 83),..... 32

MEDICINE

Character of Compensatory-Adaptation Reactions of Animal Organisms During Adaptation to High Altitudes  
(A. Yu. Tili, A. K. Kadyraliyev, et al.; ZDRAVOOKHRANENIYE KIRGIZII, No 5, Sep-Oct 83)..... 34

Influence of Cerebral Membrane Lyophilization on Properties of Opiate Receptors  
(S. V. Zaytsev, I. N. Kurochkin, et al.; DOKLADY AKADEMII NAUK SSSR, No 4, Oct 83)..... 34

Pulmonary Hyperinflation of Lungs and Inhalation of Helium-Oxygen Mixture in Prophylaxis in Post-Operative Pneumonia  
(V. V. Yatskiv; KLINICHESKAYA KHIRURGIYA, No 10, Oct 83). 35

Effects of Hyperbaric Oxygenation on Conformational Changes in Myocardial Proteins  
(L. A. Bokeriya, A. V. Pogosova, et al.; ANESTEZIOLOGIYA I REANIMATOLOGIYA, No 2, Mar-Apr 83).... 36

MICROBIOLOGY

Comparative Study of Phospholipase Activity in Pathogenic and Saprophytic Leptospira Grown on Serum-Lecithin Agar  
(L. F. Levina, Ye. G. Volina, et al.; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83)..... 37

Study of Degree of Ballast Heterogenous Protein Purity in Chemical Typhus Vaccine  
(G. A. Maksimova, T. A. Sedova, et al.; ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII, No 8, Aug 83),..... 38

Growing of Methane-Oxidizing Bacteria on Methane Extracted From Coal Seams  
(I. K. Kurdish, D. V. Chernyshenko, et al.; MIKROBIOLOGICHESKIY ZHURNAL, No 3, May-Jun 83)..... 38

Antimicrobial Properties of New Synthetic Detergent 'Fiton'  
(I. A. Vasilevskaya, M. G. Sergeychuk, et al.; MIKROBIOLOGICHESKIY ZHURNAL, No 3, May-Jun 83)..... 39

DNA Concentration in *Bacillus*, *Pseudomonas*, *Proteus* and *Vibrio* Rods  
(A. I. Korotyayev, T. P. Krolichenko; BIOLOGICHESKIYE NAUKI, No 9, Sep 83)..... 40

## MILITARY MEDICINE

Surgical Management of Penetrating Gunshot Wounds of Chest  
(A. P. Kolesov, L. N. Bisenkov; VESTNIK KHIRURGII  
IMENI I. I. GREKOVA, No 10, Oct 83)..... 41

## PHARMACOLOGY AND TOXICOLOGY

'Dose-Effect' Dependence in Entry of Chemical Substances  
Through Skin  
(V. D. Gostinskiy; VRACHEBNOYE DELO, No 5, May 83)..... 42

Production of Thermolabile Enterotoxin as Lysates of Cultures  
of Enterotoxigenic Escherichia Coli in Distilled Water  
(V. K. Kleganov; LABORATORNOYE DELO, No 1, Jan 83)..... 43

Changes in Na,K-ATPase Activities of Subcellular Fractions of  
Rat CNS in Botulism  
(N. P. Chesnokova, T. A. Nevyazhay; PATOLOGICHESKAYA  
FIZIOLOGIYA I EKSPERIMENTAL'NAYA TERAPIYA, No 2,  
Mar-Apr 83),..... 43

Determination of Volatile Compounds in Biological Fluids by  
Gas Chromatographic Analysis of Equilibrium Vapor Phase:  
Literature Review  
(V. A. Fateyev, N. S. Titov, et al.; LABORATORNOYE  
DELO, No 5, May 83)..... 44

Development of Methodologic Approach to Establishment of  
Emergency Limits of Action of Chemical Substances  
(A. I. Etyngon, T. A. Shashina, et al.; GIGIYENA I  
SANITARIYA, No 8, Aug 83)..... 44

Effect of Phallotoxins on Mechanism of  $Ca^{++}$  Activation of  
Glycerinated Fibers of Rabbit's M. Psoas  
(B. Ya. Son'kin, A. Ye. Bukatina, et al.; BIOFIZIKA,  
No 5, Sep-Oct 83)..... 45

Voltage-Dependent Changes in Ion Selectivity of Batrachotoxin-  
Modified Sodium Channels in Frog Nerve  
(G. N. Mozhayeva, A. P. Naumov, et al.;  
NEYROFIZIOLOGIYA, No 5, Sep-Oct 83)..... 46

Ion Conductance Via Batrachotoxin-Modified Sodium Channels of  
Frog Nodal Membrane at High Positive and Negative Potentials  
(G. N. Mozhayeva, A. P. Naumov, et al.;  
NEYROFIZIOLOGIYA, No 5, Sep-Oct 83)..... 46

Synthesis and Anticholinesterase Activity of Acetylene  
Organophosphorus Compounds  
(Ye. K. Balashova, A. P. Brestkin, et al.; DOKLADY  
AKADEMII NAUK SSSR, No 2, Sep 83)..... 47

Combined Effects of Reversible and Irreversible Cholinesterase Inhibitors on Neuromuscular Transmission in Rat Diaphgram (T. M. Drabkina, V. I. Kuleshov, et al.; BIOLOGICHESKIYE NAUKI, No 9, Sep 83).....	48
Effects of Scorpion Buthus Eupeus Venom on Neurohumoral Regulation in Rats (B. N. Orlov, D. B. Gelashvili, et al.; BIOLOGICHESKIYE NAUKI, No 4, Apr 83).....	48
Effects of Derivatives of Phospholipase A <sub>2</sub> From Naja Naja Oxiana Venom on Miniature End-Plate Potentials of Mammalian Muscles (M. V. Kondashevskaya, A. Ye. Ayanyan; BIOLOGICHESKIYE NAUKI, No 4, Apr 83).....	49
<b>PUBLIC HEALTH</b>	
Prevention and Therapy in Health Maintenance of Multipass in Rural Areas (Z. B. Eshmuradova; MEDITSINSKIY ZHURNAL UZBEKISTANA, No 1, Jan 83).....	50
Serum Iron Levels and Erythrocyte Indicators in Multiparas During Pregnancy and Puerperium (B. B. Pal'yanova, Sh. D. Kurbanniyazova; ZDRAVOKHRANENIYE TURKMENISTANA, No 4, Apr 83).....	51
<b>RADIATION BIOLOGY</b>	
Damage of Superhelical Nuclear DNA by Gamma-Irradiation and Heavy Ions (H. Bael, G. Erzgraeber, et al.; RADIOBIOLOGIYA, No 4, Jul-Aug 83).....	52
Enhancing Biological Effectiveness of Low Energy Quantum Radiation: Microdosimetric Substantiation of Selective Radiation Effects on Chromosomes (V. F. Stepanenko, T. A. Norets, et al.; RADIOBIOLOGIYA, No 4, Jul-Aug 83).....	53
Using Mathematical Theory of Experimentation in Formulating Multicomponent Radioprotective Agents (V. G. Vladimirov, T. G. Zaytseva, et al.; RADIOBIOLOGIYA, No 4, Jul-Aug 83).....	53
Modeling Radiation Injury to DNA and Genetic Hazard of Radionuclide Decay: <sup>3</sup> H Decay-Induced Dehydrogenation of Tritiated Pyrimidine Nucleotides (V. G. Korolev, Ye. L. Ivanov, et al.; RADIOBIOLOGIYA, No 4, Jul-Aug 83).....	54

Effect of Beta-Mercaptoethanolamine on Accumulation of DNA Breaks in <i>B. Stearothermophilus</i> After Gamma- or UV-Irradiation or Nitrosomethylurea Treatment (Ye. A. Kuznetsova, L. A. Fomenko, et al.; RADIobiologiya, No 4, Jul-Aug 83).....	54
Mathematical Model for Concurrent Effects of Ionizing Radiation and Hyperthermia (V. P. Komarov, V. G. Petin; RADIobiologiya, No 4, Jul-Aug 83).....	55
Radiosensitizing and Cytotoxic Effects of Hyperthermia on Different Biological Systems: Effects on Mouse Leukemia La Cells (L. V. Shteyn, A. G. Konoplyannikov; RADIobiologiya, No 4, Jul-Aug 83).....	55
Toxic and Radiosensitizing Effects of Reduced Nitroimidazoles on <i>E. Coli</i> B/r (N. I. Ryabchenko, Yu. A. Semin, et al.; RADIobiologiya, No 4, Jul-Aug 83).....	56
Synergism of Gamma-Irradiation and Permanent Magnetic Field (A. M. Kuzin, S. E. Nizkyy; RADIobiologiya, No 4, Jul-Aug 83).....	56
Radioprotective and Toxic Effects of ATP-AET-Serotonin Combination in Mice: Optimum Component Concentrations (D. K. Benova; RADIobiologiya, No 4, Jul-Aug 83).....	57
Effects of Chronic Exposure to Microwaves on Certain Indicators of Cellular Immunity (M. G. Shandala, G. I. Vinogradov, et al.; RADIobiologiya, No 4, Jul-Aug 83).....	57
Relationship Between Lapine Vestibular Analyzer and Radiosusceptibility to 150 Gy Irradiation (A. Yu. Grigor'yev, V. S. Stepanov; RADIobiologiya, No 4, Jul-Aug 83).....	58
CONFERENCES	
Neurochemistry-Medicine (A. Galoyan; KOMMUNIST, 1 Nov 83).....	59

AGROTECHNOLOGY

UDC 575.116:633.11:632.11

GENETICS OF DROUGHT RESISTANCE IN SOFT SPRING WHEAT. PART 1. LEAF SURFACE AREA AND GRAINS PER SPIKE

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKIH NAUK in Russian Issue 2, No 10, Aug 83  
(manuscript received 9 Jun 82) pp 39-47

GAMZIKOVA, O. I., KALASHNIK, N. A. and GUDINOVA, L. G., Institute of Pedology and Agrochemistry, Siberian Department, USSR Academy of Sciences, Novosibirsk; Siberian Scientific Research Institute of Agriculture, Siberian Department, All-Union Academy of Agriculture Sciences imeni Lenin, Omsk

[Abstract] In order to determine the genetic basis underlying drought resistance in soft spring wheat and the breeding of wheat varieties suitable for the grain belt in Siberia, top-cross studies were conducted with Saratov 29, Atlas 66, Milturum 553, Omsk 9, Tselinnaya 20, Novosolyanka, and Nora varieties under field conditions. Analysis of  $F_1$  hybrids was based on the leaf surface area, number of grains per spike, and weight of 1000 grains produced under adverse climatic conditions. Under very stressful growth conditions, a positive correlation prevailed between the number of grains per spike and grain weight per plant ( $r = 0.66$ ), a parameter which was less pronounced under climatically favorable conditions ( $r = 0.49$ ). A similar correlation prevailed between leaf surface area and grain weight ( $r = 0.62 - 0.65$ ). Both the surface area and the number of grains per spike were determined by an additive-dominant genetic system, with the former factor predominating. As a rule, drought favored the expression of the nonadditive genes. Figures 3; references 22: 19 Russian, 3 Western.

[144-12172]

SELECTION OF NEW CORN VARIETIES

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKIKH NAUK in Russian Issue 2, No 10, Aug 83  
(manuscript received 1 Dec 82) pp 47-50

SIDOROV, A. N., Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk

[Abstract] A discussion is presented of the difficulties encountered in breeding hybrid varieties of corn with the desired biochemical traits, and a proposal--based on experimental trials--is advanced on the usefulness of combining different botanical groups into one corn population. As a result, the available evidence indicates that it is possible to obtain heterotic populations with grain production similar to that of standard varieties cultivated in the USSR at the present time. Further extension of such studies and implementation of such an approach would constitute a cost-effective program and also provide data for the theoretical substantiation for the genetic homeostasis in such populations of corn, and their plasticity with respect to adverse climatic conditions. References 5: 4 Russian, 1 Western.

[144-12172]

BIOCHEMISTRY

UDC 577.151.01

IMMOBILIZATION OF GLUCOSE OXIDASE ON SILICA GEL

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 36, No 7, Jul 83  
(manuscript received 13 May 83) pp 579-582

SIMONYAN, A. L., TATIKYAN, S. Sh., KHACHATRYAN, G. E., GASPARYAN, T. A.  
and AYVAZYAN, G. I., Laboratory of Radiation Biophysics, Yerevan Physics  
Institute USSR GKIAE [expansion unknown]

[Abstract] Three grades of silica gel (Nos. 1, 3, 7) were evaluated for suitability in the immobilization of glucose oxidase (GO; EC 1.1,3.4). The silica gels were treated with gamma-aminopropyltriethoxylane and activated with glutaraldehyde. Coupling of the GO to the silica gels was performed in 0.01 M phosphate buffer, pH 6.4. Analysis of the results showed that silica gel No. 7 yielded optimum results in terms of enzyme binding and activity, with the immobilized GO retaining 80% of its activity for two months. The immobilized GO preparation was deemed suitable for use in continuous technical processes. Figures 1; references 6: 3 Russian, 3 Western.

[181-12172]

UDC 577.1:061.6]:658:387

AUTOMATED CLINICAL CHEMISTRY LABORATORY. PART 3. TIME STANDARDS AND PRODUCTIVITY MANAGEMENT

Moscow LABORATORNOYE DELO in Russian No 5, May 83  
(manuscript received 2 Aug 82) pp 49-53

MAKAROVSKIY, V. V., GAYDUKOVA, N. V. and MARKOVA, V. V., Fourth Main Administration, USSR Ministry of Health, Moscow

[Abstract] A time-course analysis of the operation of a large clinical chemistry laboratory that handles in excess of 3,000 tests per day underscored the importance of automation, efficient workflow, and rational utilization of technical personnel in greater productivity and cost-effectiveness of such laboratories versus laboratories relying on manual

procedures. In the fully automated laboratories approximately 70% of the working time is devoted to analytical procedures, and 30% of the time is expended on ancillary tasks (preparing glassware, sample handling, report writing, etc.). Automation has reduced the time required for one analytical procedure to an average of 4.26 min, which is 3.3- to four-fold less time than expended in laboratories that have not undergone automation. Automation, in conjunction with computer-based data processing and result reporting, has to be supported by highly skilled technicians organized into specialized teams with well defined responsibilities for optimum performance. Figures 1; references 6: 3 Russian, 3 Western.

[169-12172]

BIOTECHNOLOGY

UDC: 536.63.577.323.577.325:3.539.213

TUNNELING BETWEEN QUASIDEGENERATE CONFORMATION STATES AND LOW TEMPERATURE  
HEAT CAPACITY OF BIOPOLYMERS. VITREOUS PROTEIN MODEL

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 272, No 4, Oct 83  
(manuscript received 7 Jul 83) pp 978-981

GOL'DANSKIY, V. I., academician, KRUPYANSKIY, Yu. F. and FLEROV, V. N.,  
Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] Up to the present, works on the dynamic properties of proteins and the correlation of these properties with kinetic data have given primary attention to above-barrier transitions among quasidegenerate conformation states. However, as the temperature decreases, the contribution of tunnel transition becomes increasingly important. This article discusses experimental data on low temperature calorimetry of biologic macromolecules, which indicate that the low temperature heat capacity of biopolymers studied to date does not follow the Debye equation at temperatures below 10 K. An attempt was made to process experimental data from the literature on low temperature heat capacity based on the classic equation for the heat capacity of inorganic and organic dielectric glasses at low temperatures. It was found that the experimental data on low temperature heat capacity of biopolymers were well described by the equation in every case. A model is developed, according to which the native protein molecule is a heterogeneous glass, a combination of vitreous areas with various glass points, rather than a crystal in which only combination of individual  $\text{CH}_3$  groups is possible. Further experimental studies of the low temperature properties of biopolymers such as DNA and proteins will be required to make the model more specific and detailed. Figures 2; references 15: 8 Russian, 7 Western.

[065-6508]

DEVELOPMENTS IN BIOTECHNOLOGY

Moscow MOLOCHNAYA PROMYSHLENNOST' in Russian No 11, Nov 83 pp 22-23

SHILER, G. G., "Uglich" Scientific Technical Department

[Abstract] The promise of biotechnology is discussed in light of recent developments, primarily as they apply to the dairy industry. Utilization of microbial cells and products of their metabolism to modify or enhance various steps in the manufacture of dairy products is a far more efficient procedure than reliance on standard chemical and physical processes. For example, at Uglich's Scientific Technical Department an enzyme preparation (lipogeotrin) has been devised which imparts to cheese the taste quality that otherwise requires 15-20 days of maturation. Other examples are also presented and serve to illustrate the advantages that have accrued from greater utilization and reliance on biotechnology in the dairy products industry, and which themselves serve only as indicators of things to come, [187-12172]

ENVIRONMENT

UDC: 577.472

COMPARATIVE ROLE OF PHYTOPLANKTON AND BACTERIOPLANKTON IN PHOSPHATE CONSUMPTION IN UPPER LAYERS OF SOUTHEASTERN PACIFIC WATER

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 272, No 4, Oct 83  
(manuscript received 2 Mar 83) pp 1003-1006

SOROKIN, Yu. I., Southern Division, Institute of Oceanology imeni P. P. Shirshov, USSR Academy of Sciences, Gelendzhik, Krasnodar kray

[Abstract] The productivity of waters of the ocean is limited and regulated by the rate of delivery of the mineral compounds of the primary biogenous elements, nitrogen and phosphorus, to the upper, illuminated layers of water. Studies have shown that nitrogen productivity is partly determined by the development of nitrogen-fixing algae in cooperation and competition with bacterioplankton acting as mineralizers and also as producers. During the 34th cruise of the research vessel AKADEMIK KURCHATOV in the southeastern Pacific, the authors attempted to determine the comparative participation of bacteria and phytoplankton in the consumption of mineral phosphate in the upper mesotrophic tropical waters of the ocean where both types of plankton were present. Consumption of mineral phosphate was determined in six hour or shorter experiments using the radioisotope  $^{32}\text{P}$ . Results are presented in tabular form, indicating that only slightly more than half of the total consumption is accounted for by phytoplankton. The remaining phosphate is consumed by bacterioplankton. The total consumption of phosphates correlates fully with primary production figures. The rate of  $\text{PO}_4\text{-P}$  consumption is usually maximum in the uppermost layer of water, down to 20 m depth. 30 to 50% of the total consumption is accounted for by bacteria in this layer. Deeper, the rate of consumption decreases rapidly, primarily due to a decrease in its consumption by phytoplankton. At the lowest depths studied, bacterial consumption amounts to 80-90% of the total. Figure 1; references 9: 4 Russian, 5 Western.

[065-6508]

## EPIDEMIOLOGY

UDC 616.981.42-036.22(574)

### HUMAN DISEASE CLUSTERING CONNECTED TO POSSIBLE INFECTION OF CATTLE WITH BRUCELLA MELITENSIS

Alma-Ata ZDRAVOKHRANENIYE KAZAKHSTANA in Russian No 4, Apr 83 pp 42-43

SATTAROV, A. I., REMENTSOVA, M. M., AMIREYEV, S. A, and SKNAR', N. V., Institute of Epidemiology, Microbiology and Infectious Diseases, KazSSR Ministry of Health

[Abstract] Data on epidemiological significance of the migration of *Br. melitensis* onto cattle are contradictory. A literature review supported this observation. A case study was then reported in which nine individuals from three neighboring families became ill with brucellosis; all of them were drinking raw milk from a single cow which eventually was shown to be infected with *Br. melitensis*. The infection must have occurred through sheep which were housed with the cow. The course of the disease depended on the lag time between infection and beginning of an active therapy.

References 10 (Russian).

[068-7813]

UDC 579.841.11: [579.61: 612.017.1

### NATURE OF CHANGES IN ANTIGEN SPECTRUM OF MELIOIDOSIS AGENT IN SUBCULTURED ANIMALS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNIBIOLOGII in Russian No 8, Aug 83 (manuscript received 13 Sep 82) pp 47-50

PETERS, M. K., PIVEN', N. N., ILYUKHIN, V. I. and BARKOV, A. M., Volgograd Scientific Research Antiplague Institute

[Abstract] Proceeding from the changes known to occur in colony morphology, biochemical activity and surface structure of the bacterial cell in *Pseudomonas pseudomallei* in enhanced virulence, a study was made of the nature of changes occurring in the antigen spectrum for this agent during passage in animals, using the Janicki et al., method of immunoelectrophoresis in mice. Experimental procedures are described. Serial passage

of *P. pseudomallei* led to increased virulence (of the order of  $10^7$ ) in experimental animals regardless of the method of administration. Increased virulence was accompanied by altered colony morphology. Precipitinogen activity was characterized by a decrease in the amount of anode-mobile and neutral antigens in the cell wall. At the same time, very high production of polysaccharide antigen 8 was observed. Figures 2; references 11: 2 Russian, 9 Western.

[119-9642]

UDC 616.98: 579.843.95] + 616.579.834.115]-036.21

PREREQUISITES FOR ECOLOGICAL PREDICTION OF RESERVOIRS OF TULAREMIA AND LEPTOSPIROSIS IN CONNECTION WITH NATIONAL ECONOMIC ACTIVITY OF PEOPLE

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 8, Aug 83 (manuscript received 12 Jan 82) pp 62-66

SINYAK, K. M., KAS'YANENKO, A. M. and KAS'YANENKO, T. I., Kiev Institute for Advanced Training of Physicians; Main Sanitary Epidemiological Administration, Ukrainian SSR Ministry of Health

[Abstract] The enormous land reclamation program now being implemented in the Ukrainian SSR is examined from the epidemiological standpoint, with particular reference to human activities known to lead to activation of aerobic microorganisms and other major ecological changes. These considerations prompted field observations in Ukrainian forest areas in Volyn and Rovno oblasts, which are predominantly swampy, to investigate natural reservoirs of tularemia and leptospirosis. It was found that the ecological changes taking place in these areas have led to changes in the specific makeup of wild animals, particularly rodent species. Details are given. Although economic activity has led to a decrease in the infection potential by the drainage of swampy areas, and even to the elimination of reservoirs of tularemia and leptospirosis, at the same time other natural reservoirs of infection appear to be forming. The construction of small artificial lakes and ponds has led to increased infection locally, with the appearance of the ondatra and the water vole, and of ticks. Activity in such reservoirs has been noted since 1975. The location of these reservoirs as a function of soil type is discussed. It is suggested that changes made to the landscape may affect bird migration, leading in turn to changes in the movement of disease agents and the formation of new reservoirs of infection. Enhanced ecological monitoring is required to further clarify the situation.

Figures 2; references 7 (Russian),

[119-9642]

UDC 612.119-063: 547.915.5'458: 579.841.93

STIMULATING EFFECT OF BRUCELLA MELITENSIS LIPOPOLYSACCHARIDE ON HEMATOPOIESIS IN MICE

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 8, Aug 83 (manuscript received 12 Jul 82) pp 84-87

KAULEN, D. R. (deceased), SANIN, A. V., KHOROBRYKH, V. V., MALIKOV, V. Ye, and DRANOVSKAYA, Ye. A., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Studies were conducted to throw further light on the meager information currently available on the mitogenic effects of Brucella lipopolysaccharide, bacterial mass and protective antigen. Experiments were conducted in male CBA, C57BL/6 and B6AF<sub>1</sub> hybrids (C57BL/6 x A/Sn)<sub>1</sub> mice using antigens from Brucella melitensis strain 565. Determination of the percentage of hematopoietic stem cells in the S-phase was done by administering 500 mg/kg of hydroxyurea, sacrificing the animals and administering lethally irradiated bone marrow to syngenetic recipients. All experimental B. melitensis antigens stimulated the formation of endogenous colonies in the spleen in irradiated mice. The degree of stimulation correlated with the antigen dose. S-phase increases in hematopoietic stem cell formation were observed 3 hours after administration of the lipopolysaccharide. Post-radiation survival in experimental animals was enhanced in B6AF<sub>1</sub> mice in which bone marrow production of hematopoietic stem cells remained virtually unchanged while spleen production increased by a factor of 1.5 compared with controls. It is concluded that B. melitensis lipopolysaccharide enhances hematopoietic stem cell activity in mice. Figures 2; references 13: 3 Russian. 10 Western. [119-9642]

UDC 616.24-002-022,7-06: 616.25-002,3]-053.2-092: 612.017.1

FEATURES OF NONSPECIFIC RESISTANCE IN CHILDREN WITH PULMONARY DISEASES CAUSED BY OPPORTUNISTIC MICROFLORA

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 8, Aug 83 (manuscript received 6 Oct 82) pp 87-92

SAVITSKAYA, K. I., LEVINA, Ye. N., VOROB'YEV, A. A. SOLODILLOVA, O. Ye. and SINITSINA, G. G., Moscow Oblast Scientific Research Clinical Institute imeni M. F. Vladimirs'kiy

[Abstract] A study was made of the indices of nonspecific resistance in 102 children aged 1 month to 3 years with acute pleural exsudate as a complication of acute destructive pneumonia at various times during the course of the disease. Investigations were conducted on microflora isolated from the site of the disease, and a comparative analysis was made of the results of immunomicrobiological studies conducted at various times during the course

of the disease. The immune status was determined from the levels of serum IgA, IgG and IgM, serum complement activity, and phagocytic activity. *Staphylococcus aureus* and *S. epidermidis*, *Streptococcus pyogenes* and *Str. faecalis*, *Pseudomonas aeruginosa*, *E. coli*, *Proteus mirabilis*, *Klebsiella aerogenes*, and *Candida* were isolated from the pleural content at periods between days 7 and 29 of the acute pneumonia. The presence of these agents correlated with lowered phagocytic activity and a lower phagocytic index, and with lower IgG and IgM levels. Lowered complement activity was also associated with the frequency of infection with *Ps. aeruginosa*. The reaction to staphylococci and *Ps. aeruginosa* occurred as a primary or secondary immune response depending on the time of infection. References 14: 10 Russian, 4 Western.  
[119-9642]

UDC 616.98: 579.843.93]-008.97-07

PROLONGED TULAREMIA CARRIER STATE IN HIGHLY SENSITIZED LABORATORY AND WILD RODENTS AND POSSIBILITY OF DEVELOPMENT OF LATENT INFECTION INTO ACUTE INFECTIOUS PROCESS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 8, Aug 83 (manuscript received 3 Feb 83) pp 108-109

PILIPENKO, V. G., SHCHEKINA, T. A. and VASIROVA, G. I., Scientific Research Antiplague Institute of the Caucasus and Transcaucasus, Stavropol

[Abstract] A series of experiments was conducted during the period 1975-1980 to clarify the question of tularemia-carrier state in rodents with varying degrees of immune response to initial administration of antigen. Experiments were conducted in 82 sensitized laboratory white mice, 40 black mice and 9 hamsters, and batches of wild voles. Experimental procedures are described. The findings showed that prolonged tularemia carrier state is possible in both laboratory and wild animals, with the possibility of death at periods long after initial infection. The relative immune status as an indispensable condition for the formation of carrier state in laboratory animals. In natural conditions this could occur as the result of the bodily penetration of a substrate of dead bacteria or of the ingestion of live virulent bacteria. No references.

[119-9642]

UDC 616.98: 579.843.93] (574) (049.32)

TULAREMIA IN KAZAKHSTAN

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 8, Aug 83 pp 114-115

OLSUF'YEV, N. G., Moscow

[Abstract] The monograph "Tularemia in Kazakhstan" by M. A. Aykimbayev (Alma-Ata, Izdatel'stvo "Nauka" 1982, 182 pages, 1 figure) is reviewed. Kazakhstan was the second place in the USSR in which tularemia was recorded (1928 in Ural Oblast), with many reservoirs of infection subsequently being detected. Tularemia reservoirs of infection have now been registered in 17 of Kazakhstan's 19 oblasts, and a total of 8,932 cases were recorded during the period 1928-1977. This first attempt to provide a general picture of tularemia in Kazakhstan contains a foreword, seven chapters, and a bibliography of 229 references. The content of the monograph is as follows: Chapter 1: a history of the disease in Kazakhstan; Chapters 2 and 3: theoretical aspects of the disease in Kazakhstan; Chapter 4: an analysis of the types of tularemia reservoirs of infection; Chapter 5: (not stated); Chapter 6: problems of the spread of tularemia among wild animals; Chapter 7: data on the prevention of tularemia. The monograph will be of use in the study of tularemia not only in Kazakhstan but throughout the USSR, and as a handbook for researchers and public health workers alike.

No references.

[119-9642]

UDC 576.895.42(47+57)

DISTRIBUTION OF DERMACENTOR PICTUS (IXODIDAE) TICK IN THE USSR

Leningrad PARAZITOLOGIYA in Russian Vol 17, No 3, May-Jun 83 pp 207-213

KULIK, I. L. and VINOKUROVA, N. S., Scientific Research Order of the Red Banner of Labor Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Based on best available literature, a map depicting the distribution of Dermacentor pictus tick in the USSR has been constructed (and illustrated in the article). The area in question covers the central and Southern regions of the European part of the USSR, the mountainous forests of Crimea, Northern Caucasus, and Eastern Transcaucasus, the Southern areas of Western Siberia, certain areas of Northern and Eastern Kazakhstan, Northern Altai, the prealpine areas of Southeastern Kazakhstan, Western Tian Shan, and the hilly steppes of Kopet-Dagh. At the present time actual distribution data within a number of these regions remains to be ascertained. Figures 2; references 37: 1 Ukrainian, 36 Russian.

[164-12172]

UDC 576.895.421

SEXUAL TRANSMISSION OF TICK-BORNE ENCEPHALITIS VIRUS IN IXODID TICKS  
(IXODIDAE)

Leningrad PARAZITOLOGIYA in Russian Vol 17, No 3, May-Jun 83 pp 214-217

CHUNIKHIN, S. P., STEFUTKINA, L. F., KOROLEV, M. B., RESHETNIKOV, I. A.  
and KHOZINSKAYA, G. A., Institute of Poliomyelitis and Viral Encephalitides,  
USSR Academy of Medical Sciences, Moscow

[Abstract] Experimental studies were conducted which unequivocally demonstrated sexual transmission of viruses responsible for tick-borne encephalitis from infected male *Ixodes persulcatus* ticks to female ticks in 50% of cases (6/12), and in 6.2% of cases involving infected male *Hyalomma anatolicum* ticks to female ticks. Electron micrographic examination of the sexual organs and sperm of the infected males revealed fully assembled viruses within the lumen of the endoplasmic reticulum and in the Golgi complex of the spermatocytes. Virions were also observed associated with the tubular network of the spermatids. Sexual transmission of the virus in the tick population is an obviously important mechanism by which the virus is maintained in the tick population, which serves both as a carrier and a reservoir of tick-borne encephalitis. Figures 1; references 5: 2 Russian, 3 Western.

[164-12172]

UDC 616.36-002-022

DIAGNOSIS OF COXSACKIEVIRUS INFECTIONS IN CONVALESCENTS FROM VIRAL  
HEPATITIS

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 2, Feb 83  
(manuscript received 13 Jul 82) pp 12-15

SHAMSUTDINOVA, A. G., candidate of medical sciences, and ZAPROMETOVA, L. V.,  
Chair of Infectious Diseases, Tashkent Order of the Red Banner of Labor  
Medical Institute; Department of Virology, Uzbek Scientific Research  
Institute of Epidemiology, Microbiology and Infectious Diseases

[Abstract] Over a two year period 25 cases of coxsackievirus infections were diagnosed in children in Tashkent. Two case studies are presented which affected children convalescing from viral hepatitis at Childrens Infectious Diseases Hospitals No. 2 and No. 5, involving a 1.5 year old boy and a 4 year, 8 month old girl after two weeks, and the clinical course in both cases was typical with anorexia, respiratory embarrassment, icterus, cyanosis, weakness, fever, etc. The girl also developed a vesicular rash which represented the first such exanthema in Uzbekistan in connection with coxsackievirus infection. The diagnosis of coxsackievirus A7 infection was confirmed by rising CF titers from 1:8 to 1:256 in the boy and from 1:4 to 1:64 in the girl. References 4 (Russian).

[166-12172]

PRINCIPLES OF SANITIZING BRUCELLOSIS FOCI AND OF PREVENTION OF HUMAN CASES  
IN UZBEKISTAN

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 2, Feb 83  
(manuscript received 13 Mar 81) pp 47-49

GALKO, I. K., and ANTONOVA, L. Ye., Republic Sanitary Epidemiologic Station,  
Uzbek SSR Ministry of Health

[Abstract] A brief review is provided of the on-going measures in Uzbekistan designed to control brucellosis among domestic farm animals and prevent human morbidity. The marked success achieved thus far by the epidemiologic, sanitary, and veterinary services is indicated by the decrease in the number of infected cattle from 4.3% in 1959 to 1.1% in 1979, and a similar drop in infected small horned animals from 11% in 1972 to 2% in 1979, with a corresponding decrease in infected sheep from 0.08% to 0.01% in the same nine year period. However, the percentage of human cases resulting from contact with infected cattle increased to ca. 30.7% between 1969 and 1979, versus a figure of 24.7% in the 1959-1968 period. The latter was ascribed to infection from privately-owned cattle. Further progress in control of brucellosis will depend on continuing vigilance in preventing human contact with infected animals and with unpasteurized dairy products, and on the testing, segregation, and immunization of infected farm animals, with test-and-slaughter methods implemented whenever necessary.  
[166-12172]

FOOD TECHNOLOGY

PROBLEM OF NUTRITIONAL PROTEIN

Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 4, Apr 83 p 79

SAMOYLENKO, V.

[Abstract] A symposium was held in Alma-Ata in February 83 devoted to the problem of medical-biological evaluation of new products from soybean proteins. Attendees included several American specialists. During this symposium papers were delivered on active problems in chemistry, biochemistry, immunology and general technology. Analytical methodology was discussed along with studies of biological activity. Therapeutic application of soybean proteins was described in a series of pediatric and adult diseases.  
[068-7813]

UDC 576.895.421

PROGNOSIS OF TICK-BORNE ENCEPHALITIDES

Leningrad PARAZITOLOGIYA in Russian Vol 17, No 5, Sep-Oct 83

NAUMOV, R. L., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] A review is provided of the approaches that may be taken in short- and long-term prognosis of tick-borne encephalitides. Consideration of the 'parasitic' system consisting of the virus, tick (carrier and reservoir), and vertebrate host depends on an understanding of the complex interrelationships among the components of this system, generation-to-generation transmission in the tick, and environmental factors that affect each component. Retrospective analyses of cyclic patterns in the parasitic system appear to offer the best basis for long-term prognosis, as accumulated data can be applied to existing circumstances and yield predictive information. Figures 1; references 59: 1 Czech, 55 Russian, 3 Western.  
[151-12172]

UDC: 639.4

COLLECTION OF PRIMOR'YE SCALLOPS FROM BOTTOM PLANTATIONS

Moscow RYBNOYE KHOZYAYSTVO in Russian No 9, Sep 83 p 28

KALASHNIKOV, V. Z., Experimental Marine Base, Far Eastern Branch, Scientific-Production Association of Commercial Fishing

[Abstract] In southern Primor'ye the bottom method of growing scallops is more widely used, than suspended growth, as more economical. Methods of collecting the scallops from bottom plantations are therefore important. Time and motion studies of divers collecting scallops were performed at the experimental base (in Pos'yet Bay) during the spring and summer in areas with 1 to 10 specimens per square meter of bottom surface. The results indicate that the mean productivity of a diver increases in proportion to the density of the scallop population, and varies from 10 to 30 specimens per minute. Divers can work effectively in water at 6°C for about 1 hour. Re-examination indicated that divers did not collect over 75% of the specimens present, which is comparable to a dredge, which collects up to 60%. The use of divers is potentially profitable, with one diving boat capable of collecting 100 tons wet weight per year. Dredges are recommended for use in deeper water.

Figure 1.

[060-6508]

INCREASING FODDER PROTEIN PRODUCTION

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR. SERIYA BIOLOGICHESKIKH I KHMICHESKIKH NAUK in Russian No 4, Jul-Aug 83  
(manuscript received 12 Apr 83) pp 54-59

LUPASHKU, M. F., LALA, M. F. and BOGUSLAVSKIY, V. M.

[Abstract] Coverage is given to the current state of fodder production in Moldavia and the plans to increase such production in the future and improve the protein yield. The basic plans for achieving this goal call for improving the quality of existing fodder crops, introduction of new varieties and cultures, growth of cereal crops in combination of legumes, better utilization and extension of irrigation and fertilization, and technical improvements in more efficient harvesting, storage and processing of the fodder crops. During the 10th Five-Year Plan production of fodder plants increased by 17.6% and of plant protein by 21%, giving corresponding per hectare increases of 24 and 33%, despite an 11% decrease in the land area allocated to fodder production.

[196-12172]

PROMISING FODDER PLANT SPECIES FOR DONBASS

Leningrad RASTITEL 'NYYE RESURSY in Russian Vol 19, No 2, 83  
(manuscript received 18 Mar 81) pp 198-204

KONDRATYUK, Ye, N., GLUKHOV, A. Z., YURCHENKO, I. T. and AZARKH, L. R.,  
Donetsk Botanical Garden, Ukrainian SSR Academy of Sciences

[Abstract] Between 1976 and 1981 a total of 204 species of plants were investigated to determine those that could have potential usefulness as fodder plants in the Donbass. The study involved determination of the ability to grow on unirrigated lands, nutrient quality, and frost resistance, as well as the factors required for successful cultivation of newly-introduced plants. Among the plants meeting the requirements of the oblast climatic conditions and providing an adequate quantity of nutritious phytomass, the most promising species were seen to be *Festuca arundinacea*, *Phalaroides arundinacea*, *Medicago falcata*, *Polygonum divaricatum* and *P. panjutinii*. References 11 (Russian).

[197-12172]

UDC 579.841.94: 579.252: 577.212.3

CLOTHING OF BORDETELLA PERTUSSIS DNA IN E. COLI BACTERIAL CELL SYSTEM

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 8, Aug 83 (manuscript received 10 Oct 82) pp 17-21

SEMINA, I. E., TARASOV, A. P., MILEYKOVSAYA, M. M., KAZENNOVA, Ye. V. and TSVETKOVA, N. V., Central Scientific Research Institute of Vaccines and Sera imeni I. I. Mechnikov, Moscow

[Abstract] Experiments are described in which hybrid plasmids containing *Bordetella pertussis* DNA were constructed and analyzed in an *E. coli* system. Strain 305 *B. pertussis* from the collection at the Moscow Scientific Research Institute of Epidemiology and Microbiology imeni G. N. Gabrichevskiy was used in the experiments with vector plasmid from *E. coli* strain C600 (thr, leu, thi, lac G, hsd,  $R_k$ , hsd,  $M_k$ ) and *E. coli* strains containing plasmid pBR 322. Experimental procedures are described. The mean value for the molecular weight of the insert was 1.5 megadaltons. Molecular weights and characteristics of translation proteins are described. Translation products included chimera proteins some of whose molecules are apparently coded by the nucleotide sequence of the vector and others by the nucleotide sequence of the *B. pertussis* DNA. High-molecular proteins probably coded by the *B. pertussis* DNA fragments were found among translation products. The possibility of *B. pertussis* gene expression in an acellular protein-synthesizing *E. coli* system has thus been demonstrated. Figures 2; references 12; 4 Russian, 8 Western, [119-9642]

TRANSFECTION AND INFECTION OF SALMONELLA PLASMID STRAINS WITH BACTERIOPHAGE P22 H5

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 8, Aug 83 (manuscript received 12 Nov 82) pp 21-27

RYAZANOVA, L. A., ZAIKIN, V. L. and LEVASHEV, V. S., Second Moscow Medical Institute imeni N. I. Pirogov

[Abstract] The effect of plasmids in various incompatible groups on the ability of *Salmonella* to absorb exogenous information molecules was studied by investigating the effectiveness of  $Ca^{2+}$ -dependent transfection of constructed plasmid strains of *Salmonella* and infection of these strains with bacteriophage P22 H5. Interspecific hybridization of *Salmonella typhimurium* strains with donor strains of *E. coli* K12 produced *S. typhimurium* LT2 WT-R and SA118 F'- and R'-transconjugant strains of *S. typhimurium*. All experimental strains were subject to transfection, with the degree of transfection depending on the specificity of the plasmid with the host strains. Details of transfection are described. R-, R<sub>S</sub>- and S-specific bacteriophages did not produce changes in the sensitivity of LT2 WT-R, while acquisition of resistance to P22 H5 at 25°C in four strains of SA118 containing plasmids R124, RA1, R64-11 and R724 indicates destruction of the lipopolysaccharide structure in these strains. Transfection of SA118 strains with RA1, R64-11 and R724 was lower than in controls, but seeding in P22 H5 in these strains was suppressed by a factor of at least  $10^{10}$  without, however, suppressing the ability to absorb this bacteriophage. Addition of  $CaCl_2$  to the medium eliminated the constraint on infection in P22 H5 determined by plasmid R124 in strain Sal8. References 28: 8 Russian, 20 Western.

[119-9642]

UDC: 575.2

CLONING OF sup 1 GENE OF YEAST SACCHAROMYCES CEREVISIAE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 272, No 4, Oct 83  
(manuscript received 4 May 83) pp 987-991

SURGUCHEV, A. P., PIPERSBERG, B., SMIRNOV, V. N., corresponding member, USSR Academy of Sciences, TER-AVANESYAN, M. D. and INGE-YECHTOMOV, S. G., All-Union Cardiologic Scientific Center, USSR Academy of Medical Sciences, Moscow; Institute of Genetics and Microbiology, Munich University, West Germany; Leningrad State University imeni A. A. Zhdanov

[Abstract] Information is presented on the cloning of the gene sup 1 of the yeast *Saccharomyces cerevisiae*, which codes ribosome proteins. Four haploid segregants isolated from slitting of hybrid D244 obtained by crossing the

strains GRF18( $\alpha$ his2-1, 151eu2-3, 112) and 25-29 V-P 2156 (aadel-14his7-1metAlsup 1) were used as recipient strains for the transformation. All strains used carried a double mutation at the his 3 gene, causing extremely low reversion frequencies. Recessive suppressor mutation in the sup 1 gene resulted in sensitivity of the recipients to elevated incubation temperature and to the presence of the antibiotic paromomycin in the medium. Transformation was performed using a bank of wild type S-288C yeast genes. The number of *E. coli* clones containing the vector with inserted fragments of yeast chromosomal DNA was 3000, assuring more than 95% probability of finding the desired gene. Groups of 150 clones were combined to extract the plasmid DNA, producing 20 DNA preparations which were used in the transformations. Addition to the protoplasts of four strains of recipient yeasts of one of 20 DNA preparations caused the appearance of clones growing under selective conditions. Testing of phenotypic characteristics showed that addition of DNA causes the appearance of clones with the following changes in recipient strain properties: His<sup>-</sup>Leu<sup>-</sup>Ade<sup>+</sup>HtsPat<sup>S</sup>→His<sup>+</sup>Leu<sup>-</sup>Ade<sup>-</sup>HtrPar<sup>R</sup>. The resistance of the transformants to elevated incubation temperature and paromomycin is explained by the presence of the dominant allele of the wild sup 1 in the vector molecule. Figures 2; references 15: 1 Russian, 14 Western. [065-6508]

UDC: 579.873.71.256.4

#### MAPPING OF UVS1 AND UVS2 MUTATIONS IN STREPTOMYCES OLIVACEUS VKX

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 3, May-Jun 83  
(manuscript received 7 Apr 82) pp 3-8

LAVRENCHUK, V. Ya., and MATSELYUKH, B. P., Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Two UV-sensitive mutations of *S. Olivaceus* VKX, which were previously described, are mapped. The strains used were 22 UVS1 and 50 UVS2, differing greatly in reparation properties after exposure to UV light. Strains which had been preliminarily purified of possible spontaneous mutants were crossed. Purification was achieved by production of a clone culture of each strain which retained its genetic markers. Mapping of streptomycete chromosomes by genetic haploid recombinant analysis is based on the gradient in allele frequency and minimum multiple crossing over. According to the allele frequency gradient, the locus of UVS1 may be at three different areas on the circular genome map, between adel and met1, his1 and adel, or between leu1 and his1. Observation of the second criterion, minimum multiple crossing over necessary to form the recombinants, was used to select the most probable model. Preference is given on this basis to the first model with sequence of loci adel UVS1 met1. The same method was used to map the UVS2 mutation, probably in the area between the genes rib1 and met1. These data confirm membership of the mutations in two reparation genes previously not differentiated due to the practically indistinguishable sensitivity of the strains to gamma rays, mitomycin C and nitrosoguanidine. References 20: 9 Russian, 11 Western. [061-6508]

UDC: 579.841.11.25

STUDY OF POSSIBILITY OF CONJUGATION TRANSMISSION OF RP4 PLASMID FROM  
PSEUDOMONAS AERUGINOSA TO STRAINS PSEUDOMONAS MALLEI AND PSEUDOMONAS  
PSEUDOMALLEI

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 3, May-Jun 83  
(manuscript received 25 Jan 82) pp 11-14

PETERS, M. K., SHIPOVSKAYA, N. P. and MERINOVA, L. K., Volgograd Antiplague  
Scientific Research Institute

[Abstract] The purpose of this work was to determine the possibility of conjugation transmission of the plasmid RP4 from *Pseudomonas aeruginosa* to various strains of the malleioidosis and glanders pathogens, among the genetically-least-studied pseudomonads. Clones grown on selective media were cultivated on *pseudomonas* agar F. Effectiveness of conjugation was judged from the number of recombinant clones per donor cell. It was found that the strains of the two species of microorganisms available in the collection have different recipient capacity for RP4 plasmid. All strains of *P. mallei* and *P. pseudomallei* can be divided into three groups according to receptivity for RP4. The addition of DNAase at 50  $\mu$ g/ml to the conjugation mixture did not influence the frequency of recombinant formation, which eliminated the phenomenon of spontaneous transformation. All the recombinant clones studied were resistant to tetracycline and kanamycin. Effective retransmission of the RP4 plasmid and its relative stability in the strains of *P. mallei* and *P. pseudomallei* will allow future studies to concentrate on the donor properties of the strains which carry it and their use for mapping of the chromosomes of the pathogens. Figure 1; references 10: 3 Russian, 7 Western.

[061-6508]

IMMUNOLOGY

UDC 616.9-078.73: 001.8

PRESENT AND FUTURE OF IMMUNOENZYME ASSAY RESEARCH METHODS IN INFECTIOUS PATHOLOGY

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian  
No 8, Aug 83 (manuscript received 16 Feb 83) pp 3-7

POKROVSKIY, V. I., YERMOLIN, G. A. and SHABALINA, S. V., Central Scientific Research Institute of Epidemiology, USSR Ministry of Health; Institute of Experimental Cardiology of the All-Union Cardiological Center, USSR Academy of Medical Sciences, Moscow

[Abstract] Soviet and foreign developments in immunoassay research are reviewed. The main areas of application for immunoassay work lie, in addition to problems in immunology, protein chemistry and genetics, in accurate quantitative methods for determination of biologically-active molecules (antigens, antibodies, hormones, serum and tissue proteins and so forth). Immunologic methods are used in the diagnosis of infectious diseases, epidemiological monitoring of the level of infectious disease, evaluating vaccines and studying the pathogenesis of infectious diseases. Radioimmune and immunoenzyme assays are now considered the most promising methods in this field. Work by American researchers on immunoenzyme assays is described. In the Soviet Union these methods are particularly valuable for detecting natural sites of infection for particularly dangerous infections such as cholera, plague and others. The use of the immunoenzyme assay in parasitology is discussed. Many of the advances made in the use of the immunoenzyme assay in viral infections have been made abroad. In the USSR work on the development of tests for infectious and parasitic diseases based on the immunoenzyme assay are being developed at the USSR Ministry of Health Central Scientific Research Institute of Epidemiology, the Central Institute for Advanced Training of Physicians, the Central Scientific Research Institute of Vaccines and Sera imeni I. I. Mechnikov, the Moscow State University Faculty of Enzymology, the Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, and the USSR Academy of Medical Sciences Institute of Experimental Cardiology at the All-Union Cardiological Center. Achievements to date include the development and approval of tests for identifying meningococcal antigen and antibodies, *Salmonella* antigen and antibodies, tetanus antitoxin and streptococcal infections, and diagnostic tests for hospital infections, parasitic diseases, and the detection of intracellular

immunoglobulins in dysentery patients. References 42: 19 Russian,  
23 Western.  
[119-9642]

UDC: 612.112.94.015.1:577.152.1].014.46:615.371:579.852.11

CHANGES IN ACTIVITIES OF CERTAIN DEHYDROGENASES IN GUINEA PIG AND RABBIT  
LYMPHOCYTES AFTER IMMUNIZATION WITH ANTHRAX VACCINE

Moscow IMMUNOLOGIYA in Russian No 3, May-Jun 83  
(manuscript received 8 Jan 82) pp 43-46

SMIRNOV, V. S., MERETSKOV, V. V., LEBEDINSKIY, V. A. and GARIN, N. S.

[Abstract] Results are presented from a determination of the activity of certain guinea pig and rabbit peripheral blood lymphocyte dehydrogenases after immunization with live and chemical anthrax vaccines. Enzymes studied were succinate dehydrogenase, mitochondrial  $\alpha$ -glycerophosphate dehydrogenase, lactate dehydrogenase and nicotinamide adenine dinucleotide diaphorase, selected because a correlation has been demonstrated between the activity of these enzymes and the immune status of the organism. The animals were vaccinated one time with one of two vaccines studied. Enzyme activity was determined before immunization, and on days 7, 14 and 21 after immunization by a quantitative cytochemical method. Statistically reliable changes in SDH and NADNDp were observed, SDH activity increasing then decreasing, NADNDp activity gradually decreasing. The lymphocyte activity changes were independent of the type of vaccine used. In guinea pigs a reliable decrease in LDH activity was observed, in rabbits no such change was noted.

References 18: 13 Russian, 5 Western.

[064-6508]

UDC: 616.98:579.852.11]-092.9-07:616.155.32-097

ESTIMATION OF IMMUNE STATUS IN EXPERIMENTAL TETANUS POISONING

Moscow IMMUNOLOGIYA in Russian No 3, May-Jun 83  
(manuscript received 28 Dec 80) pp 46-48

KRYZHANOVSKIY, G. N., POLYAK, A. I., RUMBESHT, L. M. and KISHKOVSKAYA, O. V., Institute of general Pathology and Pathologic Physiology, USSR Academy of Medical Sciences, Moscow; Rostov-Na-Donu Medical Institute

[Abstract] A study is presented of quantitative changes in T and B lymphocytes and nonspecific defense factors during slow tetanus intoxication. Experiments were performed on 40 rats, using two thirds DLM of tetanus toxin administered i/m in 0.25 ml of saline solution. Local tetanus developed in 1 to 2 days, general tetanus in 5 to 6 days, death in 8 to 9

days. The method of spontaneous formation of E and EAC rosette-forming cells was used to evaluate the functional status of the T and B immunity systems. The results were statistically processed by variational statistics with determination of the reliability of differences by the student criterion. It was found that the development of tetanus poisoning was accompanied by a decrease in the quantity of T and B lymphocytes and a depression in non-specific immunity factors. Introduction of inactivated toxin causes an unreliable change in cellular and humoral immunity factors. Tetanus anatoxin has no protective effect against tetanus poisoning. References 11: 8 Russian, 3 Western.  
[064-6508]

UDC: 616.98:579.841.93]-07:616.155.32-097.3

#### REACTIONS OF CELLULAR IMMUNITY IN BRUCELLOSIS PATIENTS

Moscow IMMUNOLOGIYA in Russian No 3, May-Jun 83  
(manuscript received 1 Sep 80) pp 40-43

TSIREL'SON, L. Ye., REMENTSOVA, M. M. and KASYMOVA, Kh. A., Kazakh Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases, Alma-Ata

[Abstract] A study was made to determine the possibility of using the lymphocyte blast transformation test and leukocyte migration inhibition reaction to estimate the activity and severity of an infectious process, the status of specific sensitization and certain pathogenesis mechanisms. The reactions were studied in various clinical forms of brucellosis with varying severity of the infection and were compared with the results of the generally accepted immunologic tests. 264 Brucellosis patients were studied, including 63 with the acute or subacute form, 100 with chronic brucellosis in the subcompensation and decompensation stages, 101 with chronic brucellosis in the compensation stage. The extent of cellular immunity reactions differed in various clinical forms of brucellosis. Test values were 3.2 to 4 times higher during the active stage of the infectious process than among the healthy control group. Cellular immunity reactions in the stage of compensation did not differ from those of the control group. However, in 23.8% of patients with acute and subacute Brucellosis and 4% of chronic patients in decompensation, the lymphocyte blast transformation reaction was severely reduced. The leukocyte migration inhibition reaction, in contrast, was strong in these cases. It was characteristic that as the severity of the infectious process decreased, there was an increase in the capability of lymphocytes for transformation to blasts. The two reactions thus reflect the activity of the infectious process in chronic brucellosis, yielding positive results in seronegative cases, indicating that they can be used to estimate the activity of the infection. Figures 2; references 6: 2 Russian, 4 Western.  
[064-6508]

UDC 576.851.45+576.852

ISOLATION OF E ANTIGEN FROM PLAGUE AND PSEUDOTUBERCULOSIS RODS AND INDUCTION  
OF SPECIFIC ANTISERA

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 2, Feb 83  
(manuscript received 1 Nov 79) pp 69-70

ORLOV, G. S. and BADAYEVA, T. M., Military Medicine Service, Turkestan  
Military Okrug

[Abstract] The high incidence of IgE antibodies in animals immunized with plague and pseudotuberculosis rods led to studies on the isolation of a putative E antigen from these bacilli. Isolation of an immunochemically-pure E antigen was achieved by a series of steps involving cultivation of the microorganisms at 28°C and pH 7.2 to minimize production of V-W and pH 6 antigens, disintegration of the microbial biomass, and salt fractionation and immunoprecipitation with standard antisera and anti-E sera. Eventually, a monospecific rabbit antiserum was obtained with a titer of 1:24 in gel diffusion after adsorption with contaminating antigens. Such monospecific anti-E antigen diagnosticums can be used in establishing the biological and epidemiological significance of the E antigen in these two *Yersinia* species.  
[166-12172]

UDC 616.98:578.833.26]-092.9-07:616.155.32-097

AUTOREACTIVE T LYMPHOCYTES IN EXPERIMENTAL TICK-BORNE ENCEPHALITIDES:  
HETEROGENEITY AND INTERACTION WITH VIRUS-INDUCED T SUPPRESSORS

Moscow IMMUNOLOGIYA in Russian No 5, Sep-Oct 83  
(manuscript received 19 Feb 82) pp 62-65

KHOZINSKIY, V. V. and SEMENOV, B. F., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] Studies conducted on CBA mice demonstrated that infection with tick-borne encephalitis (TBE) virus or Langat virus leads to the appearance of two populations of autoreactive T lymphocytes in the spleen. One set of such T cells can induce GVH reaction in syngeneic mice but cannot lyse *in vitro* uninfected target cells, while the other is cytolytic for uninfected syngeneic cells *in vitro* and is a precursor of autoreactive cytotoxic T lymphocytes (ACTL). Differentiation of the precursors into mature ACTL requires their passage in irradiated syngeneic mice serving as recipients. Such differentiation in the infected mice appears to be interfered with by T lymphocyte suppressor cells which are formed in the lymph nodes and the thymus. It appears that the T suppressor cells formed in mice infected with the TBE or Langat viruses exert a protective effect by preventing the maturation of the ACTL precursor cells into cells that would potentiate the pathogenetic process underlying infection with the viruses in question.  
References 13: 4 Russian, 9 Western.  
[188-12172]

## LASER EFFECTS

UDC 616.833=085+615.849.19

### MORPHOLOGICAL SUBSTANTIATION FOR CLINICAL USE OF HELIUM-NEON LASER IN PERIPHERAL NERVE-TRUNK DISEASES

Kiev VRACHEBNOYE DELO in Russian No 5, May 83  
(manuscript received 9 Dec 82) pp 93-95

YURAKH, Ye. M., Chair of Human Anatomy (Chairman Prof. V. L. Zelyak) at Ivano-Frankovsk Medical Institute (Scientific Director: Distinguished Scientist of UkrSSR - Prof. Ye. P. Mel'man)

**[Abstract]** Myeloangioarchitectonics of sciatic nerve was studied on 15 adult male cats after exposure to helium-neon laser LG-75. The light beam was directed at the femur along the projection line of the sciatic nerve. Three series of experiments were performed irradiating the animals for 2, 5, and 10 minutes daily for 15 days. Controls were not exposed to laser radiation. The results showed that statistically significant dilatation of all micro-circulation links was noted only in the 5 min exposure group (90 Joules total exposure dose). With 10 min exposure the diameters of precapillaries and capillaries was decreased. Internal diameter of arterioles, postcapillaries and small veins did not change. In general, intratruncal blood vessels which are in direct proximity to nerve tissue react more significantly to helium-neon laser than the epineural hematic channel.

[047-7813]

INFLUENCE OF LOW-INTENSITY PERIODIC-PULSED LASER UV-RADIATION ON SPEED OF SYNTHESIS OF NUCLEIC ACIDS IN PROLIFERATING AND RESTING CELLS

Leningrad TSITOLOGIYA in Russian Vol 25 No 10, Oct 83  
(manuscript received 9 Jun 82) pp 1207-1212

KARU, T. Y., FEDOSEYEVA, G. Ye., YUDAKHINA, Ye. V., KALENDÖ, G. S. and LOBKÖ, V. V., Scientific Research Center of Labor Technology, USSR Academy of Sciences, Troitsk, Moscow Oblast; Oncological Scientific Center, USSR Academy of Medical Sciences, Moscow; Institute of Spectroscopy, USSR AS, Troitsk, Moscow Oblast.

[Abstract] Use is reported of a radiation-form which is new in photobiology studies, a radiation in the UV-range of the spectrum--low-intensity, periodic-pulsed. The source as a copper vapor laser with pulses at a wavelength of 510.5 and 578.2 nm, frequency 10 kHz and average power, several watts. Summary frequency of these two wavelengths in a non-linear crystal can yield pulses of UV-radiation at 271.2 nm, frequency 10 kHz (duration of pulse  $18.1 \times 10^{-9}$  s), average power up to  $10^{-9}$  W and peak power to 10 W. In contrast to continuous UV-radiation, the radiation has a periodic, repetitive character; also, pulse-power is inadequate to cause any non-linear effects in the biomolecules. The present article supplements recent work by the authors with this radiation, to determine its effect on nucleic acid synthesis. Hela cancer cells and normal fibroblastic cells of a No. 431 hamster in either a logarithmic or a resting growth stage were irradiated with copper-vapor, second harmonic, laser, wavelength 271.2 nm. Pulse duration, 18 ns. (Features of the device and its application are described and illustrated). Irradiation in the range of doses 0.05 to 5 J/m<sup>2</sup> stimulated synthesis of DNA in resting cells, but not in proliferating cells. Within the dose range, the number of DNA-synthesizing cells increased, 2.5 h after the irradiation. For RNA, no stimulation was seen in the resting cells.

Figures 6; references 10: 5 Russian, 5 Western.

[206-8586]

EFFECT OF LASER RADIATION ON NON-SPECIFIC FACTORS OF PROTECTION OF THE ORGANISM DURING EXPERIMENTAL INFLAMMATION

Alma Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR. SERIYA BIOLOGICHESKAYA in Russian No 2, Mar-Apr 83 pp 70-73

SUPIYEV, T. K. and KARABAYEVA, S. I., Alma Ata Order of Red Banner of Labor State Medical Institute

[Abstract] The effect of a helium-neon laser (HNL) on the course of an aseptic inflammation in the soft tissues of the lower jaw, and on factors

characteristic of the non-specific resistance of animals, was studied in 90 chinchilla rabbits weighing 1800-2200 g. Inflammation was induced by sc. injections of croton oil in corn oil. The experimental animals were exposed to HNL at the site of the inflammation 30 min after oil injection (30 animals) or on the 3rd day of the disease (30); irradiation, using the LG-75 laser was for 3 min, continuous mode 20 mW, 0.63  $\mu$ m wavelength. Controls (30) were untreated. Blood chemistries, morphological and histological studies were carried out on the animals up to 45 days after the start of the experiment. to monitor the symptoms of the inflammatory process. Laser therapy was found to lessen the acute course of the disease and to prevent the development of profound changes in blood serum proteins. A tabulation indicates that the laser action stimulated non-specific protective factors of the hemopoietic system. The morphological studies confirmed favorable action of the laser therapy on the course of the inflammatory process. Although the early irradiation had a limited effect, the late (3rd day application) confined the process and facilitated its resolution. References 5 (Russian).

[204-8586]

UDC: 617.735-007.281-089

DIAGNOSIS AND LASER TREATMENT OF PRERETINAL MACULAR FIBROSIS AFTER SURGICAL TREATMENT OF RETINAL DETACHMENT

Moscow VESTNIK OFTAL'MOLOGII in Russian No 5, Sep-Oct 83  
(manuscript received 10 Dec 82) pp 34-38

YELISEYEVA, E. G., PIVOVAROV, N. N., BAGDASAROVA, T. A., LIKHNIKEVICH, Ye. N. and BOL'SHUNOV, A. V., All-Union Scientific Research Institute of Eye Diseases (director, Academician, USSR Academy of Medical Sciences, Professor Professor M. M. Krasnov), USSR Ministry of Health, Moscow

[Abstract] Preretinal macular fibrosis is a major cause of reduced visual acuity following surgical treatment of retinal detachment. Researchers do not agree as to the etiology and pathogenic basis of this disease. The authors conclude that the pathology results from a combination of unfavorable factors, including hypoxia, traumatization of tissues and inflammation. Diagnosis is difficult, particularly in the early stages of the disease, and is based on direct ophthalmoscopy, biomicroscopy with a contact lens and fluorescent angiography. The first clinical symptoms appear 2 to 6 weeks after surgery. The stages of the disease are briefly described. There are three major stages: the nonproductive, productive and stage of massive preretinal retraction. The most effective method of treatment of the first two stages of preretinal macular fibrosis is argon laser therapy. Endovitrial surgery should be used in the stage of massive preretinal retraction. The frequency and severity of the disease are determined primarily by the involvement of the macular area in retinal detachment, duration of detachment, technical errors in surgery and repeated surgery. References 21: 4 Russian, 17 Western.

[073-6508]

EFFECTIVENESS OF LASER COAGULATION CONSIDERING NEW VISION FIXATION POINTS IN LATE STAGES OF DISCIFORM MACULODYSTROPHY

Moscow VESTNIK OFTAL'MOLOGII in Russian No 5, Sep-Oct 83  
(manuscript received 10 Mar 82) pp 42-44

IVANISHKO, Yu. A., Department of Eye Diseases (chief - Professor A. A. Bochkareva), Rostov Medical Institute

[Abstract] A study is performed of the results of laser treatment of sub-foveal neovascular membrane in comparison to results of conservative therapy, and the effectiveness of traditional methods of laser coagulation is compared with that of a new principle of laser surgery considering a new visual fixation point, suggested by the author. Fifty-six patients (59 eyes) with clinical and angiographic neovascular membrane were observed over a period of six months to four years. The neovascular membranes were located beneath the foveola or not over 200  $\mu$ m from its center. The patients were divided into three groups. Group 1 received repeated courses (2 to 5 times per year) of conservative dystrophic therapy. Patients of group 2 received laser surgery by traditional methods using an argon laser to coagulate the entire neovascular membrane except for the zone at the center of the fovea 300-500  $\mu$ m in diameter. Patients of group 3 received surgery by laser in which a new visual fixation point was fixed to replace the center of the fovea, frequently irreversibly damaged by the pathologic process. The patients were requested to adjust the guide beam of the argon laser to that the bright spot was most clearly seen, then the point of intersection of the beam with the retina was determined with an accuracy of 100  $\mu$ m. The beam was then moved up, down, left and right and the patient was requested to follow it with his eyes, thus determining the boundaries of the new visual fixation spot. The spot was usually in the zone least damaged by the pathologic process, in 13 of 20 cases shifted in the nasal or superior nasal directions from the center of the fovea, in three cases in the inferior nasal direction. The results indicate that conservative treatment is not promising. The method used for group 2 yielded a temporary effect by decreasing retinal edema but usually did not stop the growth of the neovascular membrane. Radical laser coagulation as used in group 3 resulted in recurrence of hemorrhages in only 15% of cases, progressive neovascularization in 10%. This group of patients had the highest long-term mean visual acuity. References 10: 2 Russian, 8 Western.

[073-6508]

UDC: 617.764/77-006-089:615.849.19

LASER SURGERY OF OPHTHALMIC ADNEXAE

Moscow VESTNIK OFTAL'MOLOGII in Russian No 5, Sep-Oct 83  
(manuscript received 2 Nov 82) pp 44-48

KRASNOV, M. M., professor, academician, USSR Academy of Sciences, BOL'SHUNOV, A. V. and ZIANGIROVA, G. G., candidates of medical sciences, and GEORGIYEVA, V. B., junior scientist, Department of Laser Methods of Treatment (chief - candidate of medical sciences V. S. Akapyan), All-Union Scientific Research Institute of Eye Diseases (director - M. M. Krasnov), USSR Ministry of Health, Moscow

[Abstract] A study was made of the authors' experience in laser surgery in the treatment of certain diseases of ophthalmic adnexae. One hundred fifty three patients with trichiasis and various neoplasms of the skin of the eyelids and conjunctiva were observed. A Coherent Radiation model 900 argon laser photocoagulator and a system 450 CO<sub>2</sub> surgical laser intended for otorhinolaryngology and gynecology were used. The argon laser was used to remove lesions less than 500 μm in diameter, the CO<sub>2</sub> laser for larger lesions. The coagulation technique used on naturally pigmented or preliminarily pigmented lesions with novocain anesthesia and slit lamp illumination is described. The studies confirm the basic advantages of laser surgery in comparison to traditional surgery and demonstrate the promise of the use of lasers in surgery of the ophthalmic adnexae. The reliable photoincision and photocauterization of tissues, hemostatic effect and formation of a biologic barrier around the tumor assure excellent ablative properties for laser surgery of tumors. The cosmetic effect is good, with a soft, hardly noticeable scar and virtually no deformation of the lid. References 15: 4 Russian, 11 Western.

[073-6508]

UDC 616.72-009.12-616.72-001-089.8-053.2-08:[615.814.1+612.849.19

ELECTROACUPUNCTURE AND LASER PUNCTURE IN POSTSURGICAL AND POST-TRAUMATIC CONTRACTURES IN CHILDREN AND ADOLESCENTS

Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian Vol 131, No 10, Oct 83 (manuscript received 7 Dec 82) pp 105-107

PLAKSEYCHUK, Yu. A., Kazan Scientific Research Institute of Traumatology and Orthopedics

[Abstract] Studies were conducted on the therapeutic efficacy of electro-acupuncture and laser puncture in children and adolescents in preventing contracture formation after joint injury. The rationale for the testing of these therapeutic modalities was the conviction that pain, as much as physical injury, prevents effective physical therapy and that alleviation of pain prior to physiotherapy sessions would potentiate the effectiveness of the

latter. Using standard acupuncture points, elec roacupuncture (5-20 Hz, 20-50 mcA) or laser puncture (helium-neon laser, 632.8 nm wavelength, 15 mW/cm<sup>2</sup>) was applied 25 min prior to physical therapy in 62 children and adolescents. The pain threshold in subjects treated with electroacupuncture rose on an average by 28% and in the laser group by 20%, increasing pain tolerance on an overall basis by 45%, which facilitated physical therapy. The duration of elevated tolerance to pain was 40-60 min. In all, addition of reflexotherapy to the standard management was effective in 43 of the subjects and ineffective in 19 subjects with more pronounced biomechanical defects that prevented effective treatment of the affected joints.

[167-12172]

UDC 616.5-006.6-08:615.849.19

LATE RESULTS AND COST EFFECTIVENESS OF PULSED LASER TREATMENT OF SKIN CANCER

Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian Vol 131, No 10, Oct 83 (manuscript received 11 Mar 83) pp 141-144

MOSKALIK, K. G., KOZLOV, A. P., KOZHEVNIKOV, S. Yu, and ANTASHKOVA, N. N., High Energy Laboratory and Science Administration Department, Scientific Research Institute of Oncology imeni Prof. N. N. Petrov, USSR Ministry of Health, Leningrad

[Abstract] The effectiveness of laser therapy (1.06 micrometer wavelength, 1 msec pulses, 150-350 J/cm<sup>2</sup>) in the treatment of basal cell carcinomas and flat cell carcinoma on the face was tested in the case of 1451 male and female subjects with primary and recurrent lesions. Treatment generally lasted from 0.5 to 1.5 months and resulted in scab formation which dislodged in 10-14 days and was followed by granulation and epithelialization of the wound. The patients were followed for 1 to 11 years, showing a recurrence in 0.8% of the patients treated for a primary basiloma, in 5.2% of the patients treated for recurrent basilomas, and in 9.6% of the patients treated for flat cell cancer. The entire course of therapy with the laser cost 5.17 rubles, as opposed to 27.8 rubles for standard x-ray therapy. Laser therapy of skin cancer, therefore, was shown to be an effective therapeutic modality and relatively inexpensive. Figure 1; references 12 (Russian).

[167-12172]

MARINE MAMMALS

TRANSPORTATION OF DOLPHINS FROM CUBA TO WESTERN EUROPE

Moscow VOZDUSHNYY TRANSPORT in Russian 1 Dec 83 p 4

/Article by Yu. Berezhnoy, special TASS correspondent for VOZDUSHNYY TRANSPORT, Havana: "How Dolphins Departed on a Flight"/

/Text/ The lines of the telegram, which was awaited not without anxiety in Havana, were brief: "We report that the dolphins were delivered safely to Frankfort on the Main."

"Our experiment in the transportation of this unusual live freight was successful," G. Pyatov, general representative of Aeroflot in Cuba, said. "However, Cuban biological scientists, specialists at the Havana oceanarium and, of course, we, Aeroflot workers, had to rack our brains over how to transport it on the Il-62M airliner from Cuba to Western Europe.

"We undertook the operation under the conventional name 'Dolphin' with caution. At one time we had to organize the transportation of poisonous snakes, monkeys and other exotic animals, but we did not have occasion to handle dolphins, each of which, by the way, weighs more than 1½ quintals and is about 2 meters long.

"The final decision was made only after the representatives of the Cuban Academy of Sciences firmly guaranteed that the physiological characteristics of these sea mammals, which in many respects are still enigmatic for science, made it possible to safely transport them by air. Furthermore, the appropriate medical preparations inducing a somnolent state in dolphins, which was absolutely safe for their body, as well as a special ointment protecting their skin, helped. Special devices--something between a stretcher and a hammock--were supposed to help the dolphins to while away the flight time. After all, they had to spend no less than half a day in the airliner cabin.

"The responsible assignment was entrusted to a crew headed by experienced pilot V. Lutovinov. Having removed several rows of chairs, we fenced off part of the Il's rear cabin and did everything so that the presence of the inhabitants of ocean depths in no way affected the passengers' comfort. The crew and the brigade of stewards headed by N. Andreyeva were instructed carefully.

"The dolphins arrived straight at the airplane's ramp from the oceanarium on a special trailer. There and then the peacefully snuffling and grunting mammals were lifted on board. Only after the peculiar 'cradles,' from which the elongated heads with 'beaks' and tails protruded, were installed, did the landing of passengers begin.

"The airplane flew out from the Jose Marti airport precisely on schedule and the flight over the Atlantic Ocean proceeded as usually. However, owing to bad meteorological conditions it was impossible to land in Lisbon. We had to cruise around. We decided to fly to Madrid and from there to Frankfort on the Main. Twelve and a half hours after the flight from Havana the dolphins were transferred to a small airplane awaiting them, on which they reached without any incidents the place of their permanent residence at one of Holland's oceanariums.

"We plan to continue the transportation of dolphins from Havana to European countries," G. Pyatov said in conclusion. "After all, the first four animals calmly and easily endured the long air trip, which was confirmed by the Cuban specialists accompanying them on the flight. Nor did they cause any trouble to passengers. We are now conducting negotiations with Emidict--one of the Cuban foreign trade associations--on the transportation of 10 dolphins to Europe and next year, of another 30, which will be caught on Cuba's ocean coast."

11,439  
CSO: 1840/145

MEDICINE

CHARACTER OF COMPENSATORY-ADAPTATION REACTIONS OF ANIMAL ORGANISMS DURING ADAPTATION TO HIGH ALTITUDES

Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 5, Sep-Oct 83 pp 16-20

TILIS, A. Yu., KADYRALIYEV, A. K. and KAZIEV, A. K., Chair of Pathological Physiology of Kirghiz State Medical Institute

[Abstract] The goal of the present investigation was to study the compensatory-adaptive reactions--in relationship to the adaptation time--of the cardiovascular system and the respiratory functions of animals located at various high altitude locations. Dogs were examined 2-4 days after being brought to the test locations of 2300 and 3200 meters above the sea level and, again, one month later. A control group of animals was maintained at 760 meters above the sea level. Detailed analysis of experimental data showed that at moderate elevation (2300 m) animals adapted fully to the situation, even increasing compensatory potential. At 3200 meters, adaptation occurred only after 2 months. At 2300 m the compensation-adaptation reactions developed principally along the respiratory functions, while at 3200 m more intensive performance of the circulatory apparatus was evoked.  
[063-7813]

UDC: 543.8.612.822.1

INFLUENCE OF CEREBRAL MEMBRANE LYOPHILIZATION ON PROPERTIES OF OPIATE RECEPTORS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 272, No 4, Oct 83  
(manuscript received 2 Mar 83) pp 982-984

ZAYTSEV, S. V., KUROCHKIN, I. N., SERGEYEVA, M. G., MOLOKOYEDOV, A. S., TITOV, M. I. and VARFOLOMEYEV, S. D., Moscow State University imeni M. V. Lomonosov; All-Union Cardiologic Scientific Center of the USSR Academy of Medical Sciences, Moscow

[Abstract] Male Wistar rat brains without the cerebellum were used to produce membrane preparations. Lyophilized membrane preparations were suspended in a standard medium of 5 mM N-2-hydroxyethylpiperazine-N'-2-ethane sulfonic acid, 120 mM NaCl, 5 mM KCl, 1 mM CaCl<sub>2</sub>, 1 mM MgCl<sub>2</sub>, 0.5 mM Na<sub>2</sub>HPO<sub>4</sub>, pH 7.4 at 37°C.

The process of bonding of ligands with opiate receptors was studied. Bonded and free ligands were separated by vacuum filtration. The level of non-specific bonding was determined in the presence of  $10^{-6}$  M unlabeled ligand. Studies of the stability of lyophilized membrane preparations indicated that the best method of preservation at room temperature is an atmosphere of argon. The results lead to the conclusion that lyophilization of rat brain membranes produces preparations retaining high capability for specific opiate receptor bonding, and that the preparations can be recommended for use in receptor analysis of opiates and opioid peptides. Figure 1; references 6: 2 Russian, 4 Western.  
[065-6508]

UDC 616-089.168.1-06:616.24-002.084

PULMONARY HYPERINFLATION OF LUNGS AND INHALATION OF HELIUM-OXYGEN MIXTURE  
IN PROPHYLAXIS IN POST-OPERATIVE PNEUMONIA

Kiev KLINICHESKAYA KHIRURGIYA in Russian No 10, Oct 83  
(manuscript received 18 Feb 82) pp 46-48

YATSKIV, V. V., Kiev Scientific Research Institute of Tuberculosis and  
Thoracic Surgery imeni F. G. Yanovskiy

[Abstract] Prevention of post-operation pneumonia in 45 patients who had been subjected to lobectomy is reported by the method of hyperinflation of the lungs combined with breathing of a helium-oxygen (He 60%, O<sub>2</sub> 40%) mixture. This produced an effective intrabronchial pressure--active correction of "functional atelectases"--with lower resistance to exhalation. This substantially improved pulmonary ventilation, lowered general pulmonary shunt of the blood and decreased expenditure of energy in respiratory muscles. The positive effect was attributed to the low density of helium which assured high penetrability of the mixture into the respiratory passages; the slow absorption of helium into the blood permitted the gas, during respiration, to support the alveolar framework. The O<sub>2</sub> (40%) therapy was also effective. The mixture was administered daily, postoperatively, to the patients for 30 min. Patient monitoring after the 3rd day of treatment confirmed the favorable effect of this preventive therapy which provided pulmonary ventilation, recovery of bronchial penetrability and removal of pulmonary hypertension. References 6: 4 Russian, 2 Western.  
[207-8586]

EFFECTS OF HYPERBARIC OXYGENATION ON CONFORMATIONAL CHANGES IN MYOCARDIAL PROTEINS

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian No 2, Mar-Apr 83  
(manuscript received 10 Apr 82) pp 45-47

BOKERIYA, L. A., POGOSOVA, A. V., SOKOLOVA, N. A. and KONIKOVA, A. S.,  
Laboratory of hyperbaric Oxygenation, Institute of Cardiovascular Surgery  
imeni A. N. Bakulev, USSR Academy of Medical Sciences, Moscow

[Abstract] In view of the extensive use of hyperbaric oxygenation (HBO) in clinical medicine, studies were conducted (on chinchilla rabbits) to determine the effects of HBO under normothermic ( $38^{\circ}\text{C}$ ) and hypothermic ( $20^{\circ}\text{C}$ ) conditions on the conformation status of myocardial proteins. Determinations of total and reactive SH groups demonstrated that, under conditions in which a normal body temperature is maintained, total concentration of SH groups remains essentially normal, but reactive groups decrease after 60 min of HBO (to 89.8% of control value at 2 atm, 84.3% at 3 atm, and 78.5% at 4 atm pressure). However, deep hypothermia exerted a protective effect and diminished the extent of decrease in the reactive SH groups. Induction of hypothermia immediately after HBO had no protective effect. The findings indicate that hyperbaric oxygenation can alter the conformational status of myocardial proteins and that such alterations can be diminished or prevented by hypothermia. References 14: 11 Russian, 3 Western.  
[190-12172]

MICROBIOLOGY

UDC 579.834.115: 579.222: 577.152.311

COMPARATIVE STUDY OF PHOSPHOLIPASE ACTIVITY IN PATHOGENIC AND SAPROPHYTIC  
LEPTOSPIRA GROWN ON SERUM-LECITHIN AGAR

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 8,  
Aug 83 (manuscript received 22 Jul 82) pp 27-31

LEVINA, L. F., VOLINA, Ye. G., SOBOLEVA, G. L. and ARUTYUNOVA, G. A.,  
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[Abstract] A comparative study was made of phospholipase activity in pathogenic and saprophytic Leptospira grown on serum-lecithin agar in an attempt to clarify the ability of Leptospira to ferment lipids. A total of 6 strains of saprophytic Leptospira and 25 strains of pathogenic Leptospira were studied. After the virulence of the experimental strains had been determined, phospholipase activity was studied by growing strains on serum-lecithin agar on Petri dishes at 28°C. Details of the experimental procedures are described. Colonies of saprophytic strains appeared after 6-7 days of incubation, which was the same as in the control culture. Two zones formed: zone 1 was transparent, directly adjacent to the colonies, 5-7 mm in width, while zone 2 was cloudy and 6-10 mm in width. Colony diameter was 3-5 mm. Colonies of pathogenic strains appeared later than the saprophytic strains, at 10-15 days in avirulent strains and on day 9 in virulent strains. Production of phospholipase A was associated with zone 1, and phospholipase C with zone 2 in saprophytic Leptospira; in pathogenic Leptospira only phospholipase A was found. Phospholipase activity was higher in virulent strains. It is recommended that determination of phospholipase activity in Leptospira be used to differentiate between saprophytic and pathogenic strains. Figure 1; references 20: 3 Russian, 2 Czech, 2 Hungarian, 13 Western.

[119-9642]

UDC 615.371: 579.881].012.8

STUDY OF DEGREE OF BALLAST HETEROGENOUS PROTEIN PURITY IN CHEMICAL TYPHUS VACCINE

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 8, Aug 83 (manuscript received 27 Jul 82) pp 93-98

MAKSIMOVA, G. A., SEDOVA, T. A. and NIKOL'SKAYA, V. N., State Scientific Research Institute for Standardization and Control of Biomedical Preparations imeni L. A. Tarasevich, USSR Ministry of Health, Moscow

[Abstract] A detailed study was made of the degree of purity with reference to the content of nonspecific components in chemical typhus vaccine based on *Rickettsia prowazekii* purified surface antigen obtained on egg cultures. Studies were conducted on a total of 11 batches of vaccine obtained from the Institute of Epidemiology and Microbiology imeni N. F. Gamaleya (earmarked for epidemiological testing) and a number of intermediate model preparations obtained using the normal vaccine-production technology. Determinations were made of protein content, total and protein nitrogen, and ovalbumin content, employing chemical and immunochemical methods. Vaccine activity was determined by the complement fixation test and expressed as the number of antigen units per milliliter. The results showed that the vaccine contains very little ovalbumin (zero to 5 micrograms per vaccine dose) and that the antigen contains virtually no nonprotein nitrogen-bearing components. Final concentrations of ballast protein varied broadly between 0.033 and 0.323 mg per vaccine dose, although in 7 of the 11 batches the value remained below 0.150 mg per vaccine dose. The vaccine contained 198 to 1,454 antigen units per mg protein nitrogen. The findings indicate that only about half the vaccine batches tested meet present requirements and that purification technology could be improved. Figure 1; references 10: 9 Russian, 1 Western. [119-9642]

UDC: 579.841.41.083.13+579.69:622.817

GROWING OF METHANE-OXIDIZING BACTERIA ON METHANE EXTRACTED FROM COAL SEAMS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 3, May-Jun 83 (manuscript received 4 Feb 82) pp 27-31

KURDISH, I. K., CHERNYSHENKO, D. V., SHCHUROVA, Z. P., and MALASHENKO, Yu. R., Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] The purpose of this work was development of a fermentation installation for use in coal mines for the production of large volumes of highly active suspensions of methane-oxidizing bacteria in the immediate vicinity of its usage location using methane extracted from the coal seams as the carbon supply. An Ankum-2 continuous cultivation apparatus was used

to cultivate *Methylomonas rubra* at 30°C, pH maintained at 6.8-7.2 by addition of 3% NaOH solution. A methane:air (1:4) mixture was blown through the cultivation unit at 1 liter per minute. The suspension from this unit was used to feed a larger unit for production of large quantities of the suspension by the same method, in which the methane-air mixture was blown through at 26 liters per hour per liter. The lag phase in the first cycle of cultivation was 10 to 14 hours, apparently a result of the adaptation of the microorganisms following transportation. The maximum specific growth rate of the cultures was achieved after 33 hours of growth. When the biomass in the culture fluid reached 16 g/l, bacterial suspension was extracted and replaced with an equivalent volume of fresh nutrient medium. Bacterial suspensions (2000 liters) produced by the pilot-scale installation had high methane-oxidizing activity - 200-250 nmol O<sub>2</sub>/min·mg of cells. Figures 2; references 9: 6 Russian, 3 Western.

[061-6508]

UDC: 615.451.3

#### ANTIMICROBIAL PROPERTIES OF NEW SYNTHETIC DETERGENT "FITON"

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 45, No 3, May-Jun 83  
(manuscript received 30 Mar 82) pp 62-66

VASILEVSKAYA, I. A., SERGEYCHUK, M. G., YERMAKOVA, L. Z., BEDNAYA, V. V.  
and NIKITENKO, A. G., Kiev State University

[Abstract] A study is reported of the antimicrobial and disinfecting properties of the new synthetic detergent Fiton to determine its suitability for practical use as a disinfectant in the mechanized washing of miner's rubber work clothing. The antimicrobial action of the detergent was determined by the accepted method of diffusion in agar. The test cultures included 27 strains of *Staphylococcus*, six strains of *Dermatophytes* and three strains of yeast-like fungi of the genus *Candida* obtained from patients. The sensitivity of the *Staphylococcus* to antibiotics was established by the method of standard paper disks. Fiton solutions of various concentrations were studied by the method of smears and by impressions on object glasses carrying a layer of meat-peptone agar. The experimental data indicates that 1% solutions of Fiton have a bactericidal effect is manifested in 3 minutes. The time of bactericidal action of 1% Fiton solutions on *E. coli* and *Shigella* is 20 to 30 minutes, 2% solutions acting in 10 to 15 minutes. *Diphtheria bacillus* and *enterococcus* died after 5 minutes contact with 5% solutions. *Bac. cereus* spores were affected only after 120 minutes contact with a 2% solution. When tested for decontamination of surfaces such as linoleum, 10 to 15 minutes treatment with a 2% solution was necessary to decontaminate surfaces contaminated with *Staphylococcus*; 20 minutes contact with a 1% solution or 10 minutes contact with a 2% solution was sufficient to kill *enterococcus*, 40-45 minutes contact with a 1% solution killed *E. coli*, though 10 minutes contact decreased the *E. coli* population to half the initial level. One and 2% solutions suppressed the growth of

micelial pathogenic fungi as well as Candida. 0.5-2% solutions of Fiton had a fungicidal effect. Experiments on boots indicated a fungicidal effect of a 2% solution in 10-15 minutes, 1% in 15-20 minutes, 0.5% in over 20 minutes. One minute spraying of a 1% solution at 50°C into boots, followed by 15 minutes standing and rinsing with hot water decreased the microbial population by an average of 80%. References 12: 10 Russian, 2 Western.  
[061-6508]

UDC 576.8.095.1

DNA CONCENTRATION IN BACILLUS, PSEUDOMONAS, PROTEUS AND VIBRIO RODS

Moscow BIOLOGICHESKIYE NAUKI in Russian No 9, Sep 83  
(manuscript received 27 Oct 82) pp 26-29

KOROTYAYEV, A. I. and KROLICHENKO, T. P., Chair of Microbiology, Kuban Medical Institute

[Abstract] Studies were conducted on the concentration of DNA in relation to the growth curve of *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Proteus vulgaris* and *Vibrio proteus* on various liquid media. The concentration of DNA in each culture was found to vary independently of the growth phase and, in general, was equivalent to 2-11 bacterial chromosomes. A tentative explanation of this phenomenon is that an intense growth rate requires potentiation of all the synthetic capabilities of a bacterial cell, and that full expression of this capability requires several chromosomes. This would allow for the simultaneous transcription and translation of several chromosomes and, hence, satisfy the synthetic demands of the growing bacterial population. Figures 2; references 11: 5 Russian, 6 Western.  
[146-12172]

UDC 617.54-001.45-089

SURGICAL MANAGEMENT OF PENETRATING GUNSHOT WOUNDS OF CHEST

Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian Vol 131,  
No 10, Oct 83 (manuscript received 13 Dec 82) pp 83-88

KOLESOV, A. P., professor, and BISENKOVA, L. N., doctor of medical sciences,  
Advanced Training of Physicians Surgical Clinic imeni P. A. Kupriyanov,  
Military Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] An analysis is presented of the rationale for the various therapeutic approaches toward penetrating gunshot wounds of the chest, based in part on experience acquired abroad in the Korean and Vietnamese wars. The optimum management appears to consist of early drainage of the pleural cavity, alleviation of pain, promotion of lung healing and maintenance of respiratory patency, stabilization of the chest wall, control of hemorrhage, and antimicrobial and supportive therapy. Although initial surgical cleaning of the wound appears almost always indicated, in certain cases of clean, oblique wounds without open pneumothorax and in the absence of damage to the great vessels of the chest cavity such a step may not be indicated. Immediate thoracotomy is required whenever the heart or the large blood vessels are injured or for purposes of resuscitation; early thoracotomies are performed within the first few days when indicated by continuing hemorrhage amounting to 300 ml/h, pneumothorax, massive lung damage, or injury of the esophagus, and late thoracotomies are performed for various complications, presence of large foreign bodies, cardiac tamponade, pleural empyema, etc.

(No references).

[167-12172]

PHARMACOLOGY AND TOXICOLOGY

UDC 612.79:612.014.46

"DOSE-EFFECT" DEPENDANCE IN ENTRY OF CHEMICAL SUBSTANCES THROUGH SKIN

Kiev VRACHEBNOYE DELO in Russian No 5, May 83  
(manuscript received 30 Aug 82) pp 106-109

GOSTINSKIY, V. D., Division of Toxicology (Director: candidate of Medical Sciences V. D. Gostinskiy) at Novosibirsk Regional Sanitation-Epidemiology Station

[Abstract] A literature analysis was performed of the "dose-effect" of chemical substances entering an organism through the skin in relationship to other entry routes. Based on this relationship the possibilities of extrapolating experimental data obtained on animals to human situations was discussed. Special attention was paid to the penetration rate of chemical substances into the human body. It was discovered that with ingestion of water, inhalation of air or in contacts of skin with air or water containing chemical agents, the chemical will enter the bodies of small animals in relatively higher quantities than those of larger animals. Only very few substances exhibit toxic effects regardless of their route of introduction, based strictly on the total quantity entering the body. The claim is made that one could transfer the quantitative dose effect from one route of administration to another, from lower animals to higher ones and predict the effect of synergistic action of several agents. Figure 1.  
[047-7813]

PRODUCTION OF THERMOLABILE ENTEROTOXIN AS LYSATES OF CULTURES OF ENTEROTOXIGENIC ESCHERICHIA COLI IN DISTILLED WATER

Moscow LABORATORNOYE DELO in Russian No 1, Jan 83  
(manuscript received 5 Aug 81) pp 46-49

KLEGANOV, V. K., Leningrad Scientific Research Institute of Epidemiology and Microbiology imeni Pasteur

[Abstract] Four standard strains and 114 enterotoxigenic *E. coli* (ETEK) strains (from patients with diarrheas) were studied. The test samples were prepared from the microbial sediment of 24-hr agar cultures, twice washed by centrifugation in physiological solution. The precipitate was re-suspended in distilled water (DW). A 100-billion suspension was incubated 2 h at 37°; the lysate cultures in DW (LDW) were obtained in supernatant suspension after two-stage centrifugation washings at 25° (no cooling). The LDW was demonstrated to contain the thermolabile enterotoxin of ETEK, after incubation at 37°. Its biological activity compared favorably with that of lysates prepared (in a more time-consuming way) by ultrasound disintegration or in bouillon cultures. The simple, more-rapid preparation method of producing the thermolabile toxin, to be used for identification of ETEK, should facilitate improvement in diagnosis of acute intestinal infection. References 7: 5 Russian, 2 Western.

[205-8586]

CHANGES IN Na,K-ATPase ACTIVITIES OF SUBCELLULAR FRACTIONS OF RAT CNS IN BOTULISM

Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTAL'NAYA TERAPIYA in Russian No 2, Mar-Apr 83 (manuscript received 15 Dec 81) pp 43-45

CHESNOKOVA, N. P. and NEVVAZHAY, T. A., Chair of Pathologic Physiology, Saratov Medical Institute

[Abstract] In order to determine whether the neurotoxic effects of botulin are due to membrane or metabolic perturbations, Na,K-ATPase (NKA) activities of synaptosomal and microsomal fractions of the motor cortex, hypothalamus, medulla oblongata, and cervical and lumbar spinal cord were determined in outbred rats after treatment with botulin (0.025 mg/kg, i.p.). In general, NKA was inhibited to a statistically significant extent in all of the preparations one day after botulin injection, i.e., at the height of paralysis, while the activities of Mg-ATPase remained unaffected. An exception was seen in the case of the hypothalamic microsomal fraction in which neither ATPase species was affected. In summary, these observations indicate that the N,K pump is depressed in botulism and that the metabolic derangements induced

by botulin are obviously an important factor in the pathogenesis of botulism. References 7: 2 Russian, 5 Western.  
[163-12172]

UDC 57.088.3:543.544

DETERMINATION OF VOLATILE COMPOUNDS IN BIOLOGICAL FLUIDS BY GAS CHROMATOGRAPHIC ANALYSIS OF EQUILIBRIUM VAPOR PHASE: LITERATURE REVIEW

Moscow LABORATORNOYE DELO in Russian No 5, May 83  
(manuscript received 23 Feb 82) pp 3-6

FATEYEV, V. A., TITOV, N. S. and DIUNOV, A. G., Chair of Pharmacology, Yaroslavl Medical Institute

[Abstract] A brief survey is presented of the use of gas chromatography for analysis of equilibrium vapor phase over biological fluids for the determination of volatile compounds. Particular attention is accorded to analysis of various organic compounds in blood (chloroform, ethanol, halothane, acetone, carbon tetrachloride, etc.). Gas chromatography of the vapor phase has also been found very useful in pharmacology, toxicology, forensic medicine, in various microbiological processes, in food science (particularly in detecting volatile metabolites produced by microbes that may indicate food poisoning), and in basic biochemical investigations carried out on tissue extracts. A significant advantage of the method is that it offers a high degree of accuracy, precision, repeatability and reproducibility. References 17: 13 Russian, 4 Western.

[169-12172]

UDC: 613.632+614.71/.72]:613.155.3

DEVELOPMENT OF METHODOLOGIC APPROACH TO ESTABLISHMENT OF EMERGENCY LIMITS OF ACTION OF CHEMICAL SUBSTANCES

Moscow GIGIYENA I SANITARIYA in Russian No 8, Aug 83  
(manuscript received 1 Sep 82) pp 87-88

EYTINGON, A. I., SHASHINA, T. A. and VESELOVSKAYA, K. A., Scientific Research Institute of Labor Hygiene and Occupational Diseases, USSR Academy of Medical Sciences, Moscow

[Abstract] Studies on female white rats exposed to carbon monoxide for 5 minutes were performed in order to begin to develop a basis for determining the absolute maximum short-term limits of exposure to harmful substances in emergency situations in the work place. The method, based on observation of psychomotor characteristics, blood tests and measurement of peripheral nerve transmission rates, allows animal experiments to be used to establish

the emergency level of exposure to chemical compounds which will guarantee preservation of vitally important functions of the organism and the ability of a worker independently to leave the dangerous area, as well as the maximum permissible concentration of a substance not causing subjective sensations and guaranteeing a predetermined level of mental and physical working capacity (70-90%) in an emergency situation. The maximum emergency exposure to carbon monoxide is determined to be 4000 mg/m<sup>3</sup> for 5 minutes, the MPC for normal operation is 1000 mg/m<sup>3</sup> for 5 minutes. References 7: 5 Russian, 2 Western. [065-6508]

EFFECT OF PHALLOTOXINS ON MECHANISM OF  $\text{Ca}^{++}$  ACTIVATION OF GLYCERINATED FIBERS OF RABBIT'S M. PSOAS

Moscow BIOFIZIKA in Russian Vol 28, No 5, Sep-Oct 83  
(manuscript received 19 Apr 82) pp 843-848

SON'KIN, B. Ya., BUKATINA, A. Ye. and WIELAND, T., Institute of Biophysics, USSR Academy of Sciences, Pushchino (Moskovskaya Oblast'); Max Planck Institute, Heidelberg, FRG [West Germany]

[Abstract] It was previously shown that stabilizing F-actin, the bicyclic peptide phalloidin (Ph) changes drastically the tension of glycerinized fibers and their capability to perform under autooscillating conditions. Because of the importance of the role of structural motility of actin in mechanical-chemical energy conversion in muscles, these studies were continued at different  $[\text{Ca}^{++}]$  and in a wide range of reaction times. The effect of a series of Ph-analogs with different toxicities was also investigated. The results showed that Ph exhibited strong action only with low degree of fiber activation. It changed isometric tension and increased significantly the rate constant for delayed development of tension, almost reaching the control fiber values at high  $[\text{Ca}^{++}]$ . The following order of decreasing efficiency of various phallotoxins in changing  $\text{Ca}^{++}$  sensitive parameters was noted:



This series mimicked their effectiveness in stabilizing action of F-actin structure for all Phallotoxins except dethiophalloidin, which is not a protector towards the action of KI. Figures 5; references 13: 3 Russian, 10 Western (1 by Russian authors).

[061-7813]

UDC 577.352.5:591.882

VOLTAGE-DEPENDENT CHANGES IN ION SELECTIVITY OF BATRACHOTOXIN-MODIFIED SODIUM CHANNELS IN FROG NERVE

Kiev NEYROFIZIOLOGIYA in Russian Vol 15, No 5, Sep-Oct 83  
(manuscript received 11 Jun 82) pp 485-494

MOZHAYEVA, G. N., NAUMOV, A. P. and KHODOROV, B. I., Institute of Cytology, USSR Academy of Sciences, Leningrad; Institute of Surgery imeni A. V. Vishnevskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] Ion conductance via batrachotoxin-modified sodium channels in frog (*Rana ridibunda*) myelinated nerve fibers were measured by means of voltage clamp technique. The measurements disclosed that the reverse potential ( $E_{rev}$ ) of steady-state currents was ca. 5 mV less positive than the  $E_{rev}$  of initial (peak) currents in the modified nerves. Studies with procaine and tetrodotoxin in the bathing fluid indicated that this type of change in the  $E_{rev}$  during depolarization cannot be ascribed to sodium channels that remained unaffected by batrachotoxin, open potassium channels, nonlinearity in current leakage, or any laterations in the transmembrane concentration gradient of cations. Furthermore, "instantaneous" currents indicated that  $E_{rev}$  becomes less positive as the amplitude and duration of preliminary depolarization increase. These observations indicate that the sodium/potassium selectivity of the toxin-modified channels is potential-dependent and may be predicated on a channel-bound modifier molecule. Figures 6; references 18: 5 Russian, 13 Western.

[195-12172]

UDC 577.352.5:591.882

ION CONDUCTANCE VIA BATRACHOTOXIN-MODIFIED SODIUM CHANNELS OF FROG NODAL MEMBRANE AT HIGH POSITIVE AND NEGATIVE POTENTIALS

Kiev NEYROFIZIOLOGIYA in Russian Vol 15, No 5, Sep-Oct 83  
(manuscript received 11 Jun 82) pp 495-503

MOZHAYEVA, G. N., NAUMOV, A. P. and KHODOROV, B. I., Institute of Cytology, USSR Academy of Sciences, Leningrad; Institute of Surgery imeni A. V. Vishnevskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] Measurements were made of ion conductance via batrachotoxin-modified sodium channels in frog (*Rana ridibunda*) nodal membranes over a wide range of membrane potentials, which showed that above +80 mV the conductance decreases with time. As the potentials increased, the steady-state level of conductance fell. Measurements of "instantaneous" current indicated that this was due to diminution in net channel conduction. Since treatment of the nerve with batrachotoxin had only a slight effect on the ion current kinetics, it appeared that the observed decay processes were not due to

inactivation of the channels. Addition of procaine to the bathing solution elicited a slow (on the order of decamilli-seconds), potential-dependent blockage of the toxin-modified channels at large positive potentials, while at large negative potentials (greater than -100 mV), "instantaneous" currents decreased due to a rapid voltage-dependent blockage of the channels by calcium ions. Figures 5; references 17: 3 Russian, 14 Western.  
[195-12172]

UDC 577.153.5:661.718.1:599:595.2

SYNTHESIS AND ANTICHOLINESTERASE ACTIVITY OF ACETYLENE ORGANOPHOSPHORUS COMPOUNDS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 272, No 2, Sep 83  
(manuscript received 12 Apr 83) pp 503-506

BALASHOVA, Ye. K., BRESTKIN, A. P., ZHUKOVSKIY, Yu. G., ROZENGART, V. I., SHERSTOBITOVA, O. Ye., VIKHREVA, L. A., GODOVIKOV, N. N., BABASHEVA, K. K. and KABACHNIK, M. I., academician, Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov, USSR Academy of Sciences, Leningrad; Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow

[Abstract] Studies were conducted on the inhibitory efficiency of acetylene and nonacetylene organophosphorus compounds with respect to cholinesterase (ChE) in order to define the significance of the location of the C≡C bond for inhibitory activity. To that end, a series of S-alkinyl esters of diethyl thiophosphoric acid were synthesized and tested for effectiveness in inhibiting ChE derived from a variety of species for comparison with effectiveness of analogous saturated organophosphorus inhibitors. Evaluation of the data for ChE and carboxyesterase indicated that the acetylene group is bound at the esterase site of the enzyme, but not at the anionic determinant. Furthermore, the 'acetylene factor', i.e., degree of inhibition due to the presence of the triple bond was found to decrease 2-3.5-fold as the triple bond was moved in location from the  $\alpha$ -position, to the  $\beta$ - or  $\gamma$ -position. The importance of the position of the triple bond for inhibitory activity indicates that such compounds can be invaluable tools in defining the structural features of the active sites of this class of enzymes.

References 8: 6 Russian, 2 Western.

[162-12172]

UDC 612.74+612.815

COMBINED EFFECTS OF REVERSIBLE AND IRREVERSIBLE CHOLINESTERASE INHIBITORS ON NEUROMUSCULAR TRANSMISSION IN RAT DIAPHRAGM

Moscow BIOLOGICHESKIYE NAUKI in Russian No 9, Sep 83  
(manuscript received 12 Jul 82) pp 36-40

DRAZKINA, T. M., KULESHOV, V. I., MATYUSHKIN, D. P., SANOTSKIY, V. I. and SEY, T. P., Chair of Human and Animal Physiology, Leningrad State University imeni A. A. Zhdanov

[Abstract] The rat diaphragm was employed as a model of neuromuscular transmission in studies on the combined effects of a reversible (galantamine; a tertiary ammonium compound) and an irreversible (armine; an organophosphorus compound) inhibitors of cholinesterase (ChE). The conditions modelled the action of a reversible inhibitor in overcoming the toxic effects of an irreversible inhibitor. Combined effects of both inhibitors of ChE resulted in a decreased quantal yield of the end-plate potentials; however, in response to isolated stimulations of the phrenic nerve, the amplitude of the end-plate potentials increased vis-a-vis control measurements. Furthermore, repeated discharges of the phrenic nerve in the range of ten to fifty per second in conjunction with the combined action of galantamine and armine led to marked depression of the end-plate potentials. These findings were interpreted to indicate that moderate concentrations of galantamine ( $2.5 \times 10^{-5}$  g/ml) do not interfere with the presynaptic effects of armine and that the latter acts directly on the nerve endings, i.e., has a non-anti-ChE effect, Figure 1; references 9; 6 Russian, 3 Western.  
[146-12172]

UDC 612.118.2:615.94

EFFECTS OF SCORPION BUTHUS EUPEUS VENOM ON NEUROHUMORAL REGULATION IN RATS

Moscow BIOLOGICHESKIYE NAUKI in Russian No 4, Apr 83  
(manuscript received 26 Jan 82) pp 16-19

ORLOV, B. N., GELASHVILI, D. B., YEGOROV, V. V., SIDNEV, B. N. and POTEMLINA, Chair of Human and Animal Physiology and Biochemistry, Gorky State University imeni N. I. Lobachevskiy

[Abstract] Intraperitoneal injection of the scorpion Buthus eupeus venom into albino rats in a dose of 2.5 mg/kg resulted in rapid elevation of blood levels of epinephrine and norepinephrine, reaching peak levels in 10 min, and in the blood levels of cAMP and cGMP which attained maximum concentrations in 30 min. The effects on cGMP were much more pronounced than on cAMP, giving a cAMP:cGMP ratio of 0.31 at 30 min (versus a ratio of 1.76 in control animals). Concomitantly, there was an immediate increase in blood glucose and insulin concentration which progressed to the end of the 60 min period of observation.

These observations indicate that the immediate cellular effects of the venom involve activation of the cyclase system, with the more profound effects on cGMP being ascribed to possible depolarizing effects of the venom on cell membranes. Hyperglycemia was ascribed to epinephrine effects, while the increase in insulin levels appears to involve a neural mechanism and cAMP, rather than a direct effect of the venom on pancreatic beta cells.

References 13: 6 Russian, 7 Western.

[165-12172]

UDC 577.151/.158

EFFECTS OF DERIVATIVES OF PHOSPHOLIPASE A<sub>2</sub> FROM NAJA NAJA OXIANA VENOM ON MINIATURE END-PLATE POTENTIALS OF MAMMALIAN MUSCLES

Moscow BIOLOGICHESKIYE NAUKI in Russian No 4, Apr 83 p 107

KONDASHEVSKAYA, M. V. and AYANYAN, A. Ye.

[Abstract] Phospholipase A<sub>2</sub> (PLA) isolated from the venom of the Central Asian cobra Naja naja oxiana exerts a triphasic effect on the miniature end-plate potentials (MEPP) of mammalian muscles, consisting of an initial decrease in the secretion of acetylcholine quanta, followed by enhancement, and finally complete inhibition of release. PLA congeners lacking enzymatic activity (with a carboxyl group instead of an amino group on N-terminus, a dimeric analog of phospholipase, tetranitromethane-modified tyrosine moieties) have no effect on the MEPP, while chemically-modified congeners of PLA with diminished enzymatic activity have various degrees of lesser activity. These observations indicate that the presynaptic effects of this neurotoxin are due to its PLA component. Furthermore, since chemically-modified PLA with diminished enzymatic activity are less effective, it appears that the functional site of the enzyme may be required for full expression of the neurotoxic potential of PLA.

[165-12172]

PUBLIC HEALTH

UDC 618.3-084

PREVENTION AND THERAPY IN HEALTH MAINTENANCE OF MULTIPASS IN RURAL AREAS

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 1, Jan 83  
(manuscript received 5 Jul 81) pp 52-53

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[Abstract] In Uzbekistan the interbirth interval is usually on the order of 1-1.5 years among multiparas, an insufficient time to assure full recovery of health and physiological wellbeing. In order to increase the time span between births and allow for maximum medical care 100 multiparas were placed on various contraceptives for a 3 year period: 70 of the subjects received intrauterine devices (IUD) and 30 were placed on diaphragms, contraceptive jellies, etc. IUDs were removed in 2 patients within 2 years because of the onset of hyperpolymenorrhea and they were prescribed other means of contraception. Two of the patients in IUDs and 4 subjects using other contraceptives became pregnant; all of the pregnancies were terminated. After 3 years the subjects were taken off the contraceptives and became pregnant within 2-3 months. The fact that only two infants were preterm and that the incidence of complications in pregnancy was decreased below the level generally seen in multiparas was ascribed to the greater amount of time devoted to medical care and other health-improvement programs.  
[180-12172]

UDC 618.28:612.1

SERUM IRON LEVELS AND ERYTHROCYTE INDICATORS IN MULTIPARAS DURING PREGNANCY AND PUERPERIUM

Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 4, Apr 83 pp 5-8

PAL 'VANOVA, B. B. and KURBANNIYAZOVA, Sh. D., Scientific Research Institute for the Protection of Maternal and Child Health, Turkmen SSR Ministry of Health

[Abstract] The problem of iron deficiency anemia in multiparas was investigated on 93 patients ranging in age from 25 to 40 years. The mean interval between births was 1.5 to 2 years. Evaluation of serum iron levels, erythrocyte counts, and the color index in nonpregnant and pregnant women and during the first six days of the puerperium showed that iron deficiency anemia was a chronic problem and a significant factor in the complications of pregnancy seen in 95.3% of the subjects, as well as the complications of labor and the early postpartum period seen in 20% of the subjects. These observations, in combination with a perinatal infant mortality of 7.7%, point to the need for prolonging the interval between births to three years to alleviate some of the negative effects on maternal iron balance resulting from frequent labors, attendant blood loss, prolonged lactation, and inadequate iron intake. Such women should be kept under long-term medical supervision to assure their wellbeing. References 9: 7 Russian, 2 Western.

[045-12172]

RADIATION BIOLOGY

UDC 577.391:547.963.3

DAMAGE OF SUPERHELICAL NUCLEAR DNA BY GAMMA-IRRADIATION AND HEAVY IONS

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 4, Jul-Aug 83  
(manuscript received 14 Jun 82) pp 435-438

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[Abstract] Gamma irradiation and heavy ion (He-4, C-12) were employed in studies on membrane-attached superstructure unit (MASSU) of superhelical nuclear DNA using human peripheral blood lymphocytes, Chinese hamster lung fibroblast line V79-4, and (CBA x C57Bl)F<sub>1</sub> mouse ascitic cells (Ehrlich tumor). Evaluation of the sedimentation patterns in sucrose gradient following irradiation or heavy ion bombardment demonstrated that superhelical DNA is organized into discrete MASSU. Furthermore, within MASSU, DNA exists in the form of 'clusters' that can undergo independent unwinding following single-strand breaks resulting from gamma irradiation or bombardment with the heavy ions. The mean diameter of a MASSU has been calculated at 0.2 mcm and the DNA content at  $2 \times 10^9$  dalton. The highest DNA concentration was observed in lymphocyte MASSU, and may be one of the factors responsible for the high radiosensitivity of lymphocytes, and the lowest concentration in the murine ascitic cells. Figures 3; references 9: 1 Russian, 8 Western.  
[107-12172]

UDC 577.391:591.813:535.215

ENHANCING BIOLOGICAL EFFECTIVENESS OF LOW ENERGY QUANTUM RADIATION:  
MICRODOSIMETRIC SUBSTANTIATION OF SELECTIVE RADIATION EFFECTS ON CHROMOSOMES

Moscow RADIOPHYSICS in Russian Vol 23, No 4, Jul-Aug 83  
(manuscript received 12 Apr 82) pp 439-443

STEPANENKO, V. F., NORETS, T. A. and DEDENKOV, A. N., Scientific Research Institute for Medical Radiology, USSR Academy of Medical Sciences, Obninsk

[Abstract] Microdosimetric studies were conducted with native DNA and DNA incorporating bromine and iodine atoms (via halogenated pyrimidine base analogs) to demonstrate selective radiation effects on chromosomal material in cultured melanoma B-16 cells of low energy Auger electrons and photoelectrons resulting from irradiation by low energy quanta (x-ray activation). The calculations conducted for the Auger electrons and the photoelectrons demonstrated that with decreasing biological effectiveness of x-ray activation, the methods of activation ranked as follows: irradiation with 13.474 keV quanta > irradiation with cadmium-109 quanta (22.54 keV) > irradiation with 33.17 keV quanta > irradiation with americium-241 quanta (59.536 keV). In each photoevent involving a bromine, iodine, or phosphorus atom the energy transferred to the sensitive locus was sufficient for at least one double-strand break in DNA. References 14: 6 Russian, 8 Western.

[107-12172]

UDC 577.391.51

USING MATHEMATICAL THEORY OF EXPERIMENTATION IN FORMULATING MULTICOMPONENT RADIOPROTECTIVE AGENTS

Moscow RADIOPHYSICS in Russian Vol 23, No 4, Jul-Aug 83  
(manuscript received 12 Apr 82) pp 444-448

VLADIMIROV, V. G., ZAYTSEVA, T. G., KAMENKO, I. P., PODDUBSKIY, G. A., RAZORENOV, G. I., SMIRNOVA, S. M. and TARNOPOL'SKAYA, L. G., Military Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] Multicomponent radioprotective formulations were devised on the basis of mathematical analysis of effect (animal survival) in relation to the formulation in the form of incomplete second order polynomial expressions. In concrete terms, tests were conducted with cystamine or S-( $\omega$ -aminopropyl)- $\beta$ -aminoethylthiophosphate in combination with mexamine and thiourea derivatives (ethyron, gutimine). The preparations were administered intraperitoneally 20 min prior to gamma irradiation (Co-60, 7.5 Gy, 0.4 Gy/min) in doses that ranged from 0.3 to 1.0 ED<sub>50</sub>. Survival isolines plotted against the concentration coordinates of selected components permitted graphic determinations of optimum formulations both in terms of effectiveness as radio-protectors and toxicity. Figures 2; references 2 (Russian).

[107-12172]

UDC 577.391:547.963.3

MODELING RADIATION INJURY TO DNA AND GENETIC HAZARD OF RADIONUCLIDE DECAY:  
 $^3\text{H}$  DECAY-INDUCED DEHYDROGENATION OF TRITIATED PYRIMIDINE NUCLEOTIDES

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 4, Jul-Aug 83  
(manuscript received 10 Jun 82) pp 458-461

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imeni B. P. Konstantinov, USSR Academy of Sciences

[Abstract] Studies were conducted on the viability and point mutations in a haploid strain of *Saccharomyces cerevisiae* with tritiated pyrimidine nucleotides in the DNA for correlation of radiation damage to DNA with genetic hazard due to  $^3\text{H}$  radionuclide decay. Evaluation of viability plots revealed that dehydrogenation of the incorporated radiolabeled pyrimidine nucleotides had no lethal consequence with respect to positions 5 and 6 on the thymine molecule, or position 5 on cytosine. In addition, dehydrogenation of the thymine moiety did not lead to point mutations. However, dehydrogenation of cytosine at position 5 was strongly mutagenic and, in fact, exceeded the mutagenicity of gamma irradiation. Since, under uncontrolled conditions, the amount of  $^3\text{H}$  that could localize on position 5 of cytosine is small, and since cytosine itself constitutes only a small proportion of all the bases in DNA, the amount of  $^3\text{H}$  entering the cell as  $^3\text{H}_2\text{O}$  from the environment cannot represent a greater hazard than an equivalent dose of external gamma irradiation. Figures 2; references 6: 3 Russian, 3 Western.  
[107-12172]

UDC 577.391:621.039.58:535-31

EFFECT OF BETA-MERCAPTOETHANOLAMINE ON ACCUMULATION OF DNA BREAKS IN  
*B. STEAROTHERMOPHILUS* AFTER GAMMA- OR UV-IRRADIATION OR NITROSOMETHYLUREA  
TREATMENT

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 4, Jul-Aug 83  
(manuscript received 10 May 82) pp 462-466

KUZNETSOVA, Ye. A., FOMENKO, L. A. and GAZIYEV, A. I., Institute of  
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[Abstract] Experimental conditions are described under which pretreatment of *B. stearothermophilus* cells with beta-mercaptopethanolamine decreased the accumulation of both double-strand and single-strand breaks in DNA resulting from gamma- or UV-irradiation or treatment with nitrosomethylurea. The protective effects of beta-mercaptopethanolamine were apparent immediately after irradiation and equivalent to the degree of protection observed after 30 min of incubation. The presumed protective mechanism involved complex formation between DNA and beta-mercaptopethanolamine which prevented the excision enzymes from attacking the damaged sites on DNA and subsequent enzymatic repair. Figures 2; references 8: 7 Russian, 1 Western.  
[107-12172]

## MATHEMATICAL MODEL FOR CONCURRENT EFFECTS OF IONIZING RADIATION AND HYPERTHERMIA

Moscow RADIobiologiya in Russian Vol 23, No 4, Jul-Aug 83  
 (manuscript received 27 Apr 82) pp 484-488

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[Abstract] A mathematical equation was derived to relate the synergistic effects of ionizing radiation and hyperthermia on yeast, by assuming that synergism is based on additional lethal consequences arising from the interactions of 'sub-lesions'. If  $N_1$  and  $N_2$  represent the lethal lesions due to ionizing radiation and hyperthermia, respectively, then the number of sub-lesions due to each factor are represented by  $p_1N_1$  and  $p_2N_2$ , respectively. Maximum synergism prevails at  $N_2/N_1 = p_1/p_2$ , and the maximum value for the dose-altering factor ( $k_m$ ) can then be derived from  $k_m = 1 + (p_1p_2)/(p_1 + p_2)$ . Tabular data are included which provide the  $k_m$  values for a number of yeast species at temperatures ranging from 40.0 to 55.0°C. Figure 1; references 9: 6 Russian, 3 Western.

[107-12172]

## RADIOSENSITIZING AND CYTOTOXIC EFFECTS OF HYPERTHERMIA ON DIFFERENT BIOLOGICAL SYSTEMS: EFFECTS ON MOUSE LEUKEMIA La CELLS

Moscow RADIobiologiya in Russian Vol 23, No 4, Jul-Aug 83  
 (manuscript received 12 Apr 82) pp 489-492

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[Abstract] Mouse leukemia La cells serially passaged in C57B1/6 female mice were used to study the radiosensitizing and cytotoxic effects of hyperthermia in different media. The cell suspensions were heated to 41°C for 20 min or to 43°C for 10 min and subsequently, at room temperature, gamma irradiated (Co-60) with 2, 4, or 6 Gy in the radiosensitization studies. Evaluation of the cytotoxic plots in analogy to dose-effect plots for ionizing radiation yielded a two-fold decrease in  $D_o$  per 1°C, which corresponded to an energy of activation of ca. 150 kcal/mole over the temperature range of 40 to 45°C. In physiological saline irradiation of heat-treated cells led to a decrease in the mean lethal dose ( $D_o$ ) from 2.32 Gy for unheated cells to 1.49 for the cells heated to 41°C and 0.66 Gy for cells heated to 45°C. However, in medium 199 with serum hyperthermic radiosensitization did not occur for reasons that are unclear. Figures 3; references 17: 6 Russian, 11 Western.

[107-12172]

UDC 577.391

TOXIC AND RADIOSENSITIZING EFFECTS OF REDUCED NITROIMIDAZOLES ON E. COLI B/r

Moscow RADIOPHYSICS in Russian Vol 23, No 4, Jul-Aug 83  
(manuscript received 21 Jul 82) pp 505-509

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[Abstract] Conditions are described for the spectrophotometric monitoring of the reduction of misonidazole and metronidazole by zinc dust in the presence of ammonium chloride. Reduction of misonidazole was a first order process at 20°C with a rate constant of  $2 \times 10^{-2} \text{ sec}^{-1}$  under oxygen or argon; metronidazole was reduced slowly under oxygen and required 4 h for completion, but rapidly under argon as a first order reaction with a rate constant of  $6.7 \times 10^{-3} \text{ sec}^{-1}$ . Under aerobic and anaerobic conditions the reduced nitroimidazoles were found to be far more toxic for E. coli B/r cells than the unreduced agents at 37°C. Further trials with reduced metronidazole showed that it had no radiosensitizing effect on oxygenated E. coli cells, but increased the radiosensitivity of hypoxic cells 1.64-fold to fast electrons (20 MeV; 150 Gy/min), and in that respect was 1.56-fold as effective as the unreduced compound. Figures 4; references 10: 3 Russian, 7 Western.  
[107-12172]

UDC 577.391:538.122.631.531.1

SYNERGISM OF GAMMA-IRRADIATION AND PERMANENT MAGNETIC FIELD

Moscow RADIOPHYSICS in Russian Vol 23, No 4, Jul-Aug 83  
(manuscript received 24 Jun 82) pp 510-512

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[Abstract] To evaluate the effects that a permanent magnetic field might have on radiation-induced stimulation of plant development, studies were conducted on the effects of exposure of Cs-137 gamma-irradiated (2 Gy; 5 Gy/min) soya seeds (*Glicina Max*, L., strain VNIIS-1) to a 2950 Oe permanent magnetic field 5-20 min after irradiation. Evaluation of the effects in terms of plant weight, shoot length, grain yield, etc., demonstrated that exposure to the magnetic field 5-20 min after irradiation had a synergistic effect with radiation in promoting plant growth, grain yield, etc. The magnetic field alone did not act as a plant stimulant in the absence of irradiation, neither was the magnetic field effective immediately before or after irradiation. In fact, exposure to a magnetic field immediately after irradiation had, in general, an inhibitory effect.

On a tentative basis, it appears that the free radicals arising as a result of irradiation undergo some specific reactions leading to plant stimulation within five minutes of irradiation, and that exposure to a magnetic field within that period of time abrogates their effects. Figure 1; references 1 (Russian).

[107-12172]

UDC 577.391

RADIOPROTECTIVE AND TOXIC EFFECTS OF ATP-AET-SEROTONIN COMBINATION IN MICE:  
OPTIMUM COMPONENT CONCENTRATIONS

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 4, Jul-Aug 83  
(manuscript received 23 Feb 82) pp 526-530

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[Abstract] C57BL male mice were employed in toxicity and radioprotective studies to determine the optimum component composition of ATP-AET -serotonin formulation (AET = aminoethyl-2-thiopseudourea) for radioprotective effects and minimum toxicity. Prior to x-irradiation (8.5 Gy = LD<sub>100/11</sub>) the animals were injected intraperitoneally with a given formulation. Maximum protection and minimum toxicity was shown by the ATP:AET:serotonin combination with a ratio of 45:3:1. Serotonin was the major radioprotective component with AET serving a less pronounced radioprotective role, while ATP was the major component responsible for reducing toxicity and exerted only a minor radio-protective effect. Figure 1; references 8: 4 Russian, 4 Western.

[107-12172]

UDC 577.391:612.112:613.167

EFFECTS OF CHRONIC EXPOSURE TO MICROWAVES ON CERTAIN INDICATORS OF  
CELLULAR IMMUNITY

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 4, Jul-Aug 83  
(manuscript received 9 Jun 82) pp 544-546

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[Abstract] CBA male mice and outbred rats were employed in studies on the effects of 2375 MHz SHF electromagnetic field on the state of cellular immunity in relation to the duration of exposure. Exposure of the rats for 1 month (10, 50, 500 mcW/cm<sup>2</sup>; 7 h/day) showed marked inhibition of peripheral lymphocyte blast transformation or rosette formation. Complete

recovery after discontinuation of irradiation was obtained only with the 10 mcW/cm<sup>2</sup> dose. Exposure of the rats for 3 months to 1 or 5 mcW/cm<sup>2</sup> (7 h/day) had no effect on the peripheral lymphocytes. Studies with the CBA mice (0.1 or 10 mW/cm<sup>2</sup>, 1 h/day for 1 month) showed an enhancement of phytohemagglutinin-induced blast transformation of splenic lymphocytes and proliferation of lymph node lymphocytes. These observations indicate the care that must be exercised in interpreting the effects of microwave irradiation on the immune response, and in taking into consideration species differences and the source of T cells taken for study. Figure 1; references 6: 3 Russian, 3 Western.  
[107-12172]

UDC 577.391:611.81

RELATIONSHIP BETWEEN LAPINE VESTIBULAR ANALYZER AND RADIOSUSCEPTIBILITY TO 150 Gy IRRADIATION

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 4, Jul-Aug 83  
(manuscript received 27 Apr 82) pp 549-551

GRIGOR'YEV, A. Yu. and STEPANOV, V. S., Institute of Biophysics, USSR  
Ministry of Health, Moscow

[Abstract] Functional tests were conducted on the vestibular apparatus of chinchilla rabbits for correlation with their susceptibility to 150 Gy dose gamma-irradiation. The results showed that a positive correlation coefficient (0.505  $\pm$  0.22) applied to survival time of the more radio-resistant rabbits (29.6  $\pm$  3.0 h) and a lower sensitivity threshold to angular acceleration (0.98  $\pm$  0.12 degrees/sec<sup>2</sup>) at a significance level of P = 0.05. By comparison, the threshold for the rabbits with greater radiosusceptibility (9.1  $\pm$  1.8 h survival time) was 1.41  $\pm$  0.13 degrees/sec<sup>2</sup>. Although the mechanism underlying the correlation is not understood with certainty, it appears that a certain component of the vestibular analyzers is less susceptible to the damaging effects of lethal irradiation than other parts of the CNS. References 7: 6 Russian, 1 Western.  
[107-12172]

CONFERENCES

NEUROCHEMISTRY-MEDICINE

Yerevan KOMMUNIST in Russian 1 Nov 83 p 2

GALOYAN, A., editor in chief Neyrokhimiya [Neurochemistry], corresponding member, Armenian SSR Academy of Sciences, professor

[Abstract] This article was written on the eve of the opening in Yerevan, of the 9th All-Union Conference on the Biochemistry of the Nervous System. This conference of Soviet neurochemists was logically scheduled to be held in Yerevan because the Institute of Biochemistry, Armenian SSR Academy of Sciences, is felt to be among the great scientific centers of the nation: its large team of scientists has been studying fundamental problems of nervous system biochemistry for over 25 years. The article is written in praise of neurochemistry as a key medical science. A characteristic of modern neurochemistry is that it is discovering the chemical structures and molecular mechanisms of reactions which form the basis of nervous activity. Neurochemistry is opening broad horizons for the development of neurobiology and medicine, creating a scientific basis for the treatment of neural diseases. The author calls for inclusion of neurochemistry in the program of biochemistry at medical schools. Courses on neuropathology and psychiatry at medical schools should include sections on clinical neurochemistry and neuropharmacology as well. Modern methods should be introduced to the practice of medicine, including computerized tomography.

[104-6508]

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